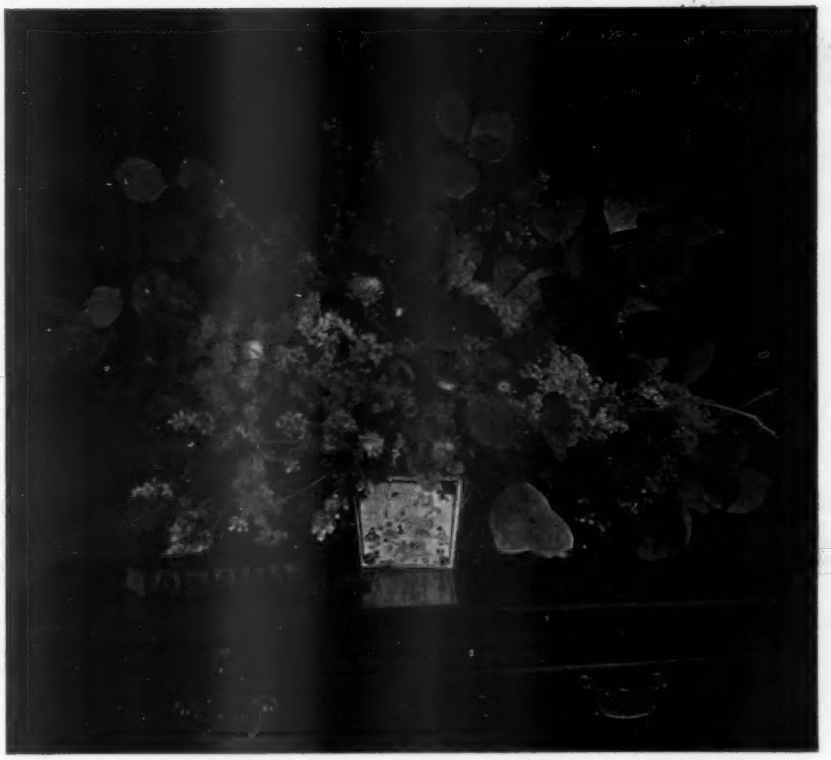
October 1950 25c

Organic Gardening

Gardening without Commercial Fertilizers



A Magazine for Discriminating Gardeners

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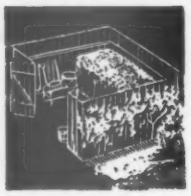
The Book of the Month for October is

The Organic Front

by J. I. Rodale



The author's first book—"Pay Dirt"— was a textbook on the general theory of organic gardening. His new book, "The Organic Front," deals more with problems and ideas that have arisen since. He treats of the "beneficial fire" in the soil, the positioning theory, free fertilizers, the principle of eminent domain, garbage disposal, the work of Weston A. Price, seashore gardening, advantages of raw food, sunflower seeds as a miracle food, the grape-cure, the Rodale Diet, and many other subjects of vital interest. 200 pp. Formerly $2.50, the regular price has just been reduced to **$1.00.** Under the Discount Plan you can obtain your copy for even less *if you act soon.*

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Organic Gardening

EMMAUS, PENNSYLVANIA

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by F. H. King

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Deals with their fundamental but little understood relationship. 122 pp., 18 full-page photographs. **$2.50.**

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by Dr. Ehrenfried Pfeiffer

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ORGANIC GARDENS
Fullerton . Maryland

Organic Gardening
Latest Developments in Plant Culture

VOL. 17, NO. 4 OCTOBER, 1950

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THE COVER

This is an arrangement of dried materials—dogwood leaves, knotweed, pearly everlasting, and strawflowers. The container is a square brick or bulb pot of Dutch Delft ware. (Photo by Thomas L. Williams, from Colonial Williamsburg).

J. I. RODALE, *Editor and Publisher* JAMES W. CRAWFORD, *Advertising Manager*
DR. WILLIAM H. EYSTER, *Managing Editor* KARL MANAHAN, *Art Director*
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THE FORUM

Dead Soil is Unproductive

Perhaps someone may suggest that it is presumptuous, if not contemptuous, for an "un-degreed" agriculturist to tender advice to farmers, many of whom have made financial successes in growing tobacco, but my suggestions are made humbly and without intention of either offending or harming. I am not fighting anybody or anything—except the false and dangerous assumption that every plant, vine and tree must be doctored with heavy doses of super-powered synthetics and that sprouts, blossoms and fruitings must be assiduously sprayed with the most deadly concoctions known to modern chemistry.

It doesn't make sense, and eventually our scientific agriculturists and agronomists will have to "backtrack" and retract. It is reasonable to believe that the plant, vine and tree take unto themselves and assimilate in their bodies some of the forcing nutritional elements which are fed to their roots. Likewise, it is easy to believe that the blooms, settings, pods and skins of vegetables, cereals and fruits absorb some of the arsenate of lead, paris green, DDT, parathion—or whatever poison the grower may use.

Incidentally and warningly, let me say that any farmer can send his baby boy or girl to any store and buy any of these deadly poisons. The farmer is himself more or less ignorant of the nature and action of these drugs and chemicals, unskilled in their uses and unaware of their damages when taken into his nostrils, mouth and lungs. Oftentimes the residues are poured on the ground or left in a tub—and the farmer loses a cow or a mule, or some of the wild game on his farm. By way of addendum, let me say

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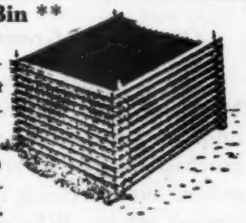

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HERSHEY ESTATES
HERSHEY, PENNSYLVANIA

that it is highly probable that our stomachs and body organs are preyed on by the poisoned food stuffs—and we become victims of cancer and other "killers."

Let me make this *quod erat demonstrandum* prediction. Farmers will never again grow wilt-free and healthy tobacco plants as long as they ruthlessly kill out the animal life in the soil of their plant beds. It is "agin" Nature. Land is dead without its animal population. There can be no soil conservation without preservation of the microbes and molecules—and the other soil "critters."

Tom

Organically Grown Foods

I am a reader of your Organic Magazine and believe in it one hundred per cent. I would like to purchase things that are organically grown, but everything is priced way beyond reason. Why should things advertised in your magazine be two and three times as much as you can purchase them in a grocery store?

It seems to me that if the organic farmer would price his products at the current prices prevailing, plus postage, that would be gain enough for him. Everything is a racket. All the organic materials such as foodstuffs are priced so high that the ordinary person cannot afford to buy them. Why should they charge 30 cents a pound for carrots, which is three times as high as the same can be purchased in a grocery store? True, they are better, but how is this program going to benefit the thousands that cannot afford such high prices? If the current retail price was charged, that is gain enough for anyone. Why don't you start a revolution along this line and price your own things down to a level that the average consummer can afford? Everyone wants the best, but only the rich can have it, as it is. It doesn't cost more to farm the organic way, so why hike the prices up? I bought a box of oranges the other day, and had to pay seven dollars for it. Why can't they make a fair profit and be satisfied with it? When flour can be purchased on the market for two or three dollars a sack, why do we have to pay fifteen and twenty dollars a sack for wholewheat flour? I call it plain robbery. If you want to help the common man, why not lower your prices within his reach?

Ella M. VanLanen
Canby, California

Composted Plants

Since many of my own summer plants have been staying alive through the frosts, I can now say that it is due to compost making them hardier (I heard that one from the Organic Magazine.) Pole Lima beans are still alive and loaded with buds for an early crop, and a few squash and tomato vines are still blooming.

Ray's Half Acre
4241 LaSalle Avenue
Culver City, Calif.

No Insects

When we moved here, some neighbor made us acquainted with the Organic Method, and we have been using this natural way ever since. Every year we make heaps of compost and apply same to the fruit trees. We do not spray our trees and no insects seem to bother them. The ground is full of large earthworms, which are loosening up the soil around the tree roots.

Earthworms

You suggest that we try out different things for our own satisfaction and if they work out satisfactorily, then pass the information on to you.

I purchased a batch of earthworms from one of your advertisers and decided to see for myself just how fast they would multiply in one year.

I selected two good sized common garden worms and two of the Dr. Oliver worms that I purchased and placed them in separate boxes and cared for them as nearly as possible

in the same way for one year, and then counted them.

I found only 7 of the common worms and no young ones or capsules, and to my surprise I counted 345 mature worms, 1,832 1-inch or more in length and 1,773 less than 1 inch in length from the two original domesticated worms, making a total of 3,950 worms in one year from these two original worms. I also counted 252 eggs, or capsules.

E. F. Easterbrooks,
Route 1, Box 124,
Corning, California

Fourth Use of Home-Ground Flour

I have read in the January issue (1950) of your important monthly guide about three uses of home-ground flour by Floyd W. Morris.

I want to relate to you hereunder about a fourth use of whole wheat grains:

I bring the grains to sprouting after they are soaked in little water during 24 hours and grind them in a hand mill for meat together with dried fruits such as figs and carobs. To every two tablespoons of grains I am adding one cup of sour milk and mix all the ingredients. This is an excellent food which gives us strength and health. I wish only I could get grains grown without fertilizers and poisonous sprays. Last year the fields were sprayed very successfully with the aim to prevent the growing of weeds. I believe, however, that the spraying has had a bad influence on the value of the grains.

Roma Zur
26, Hilel Street
Haifa, Israel

Potatoes Planted with Compost. WOW!

Why the exclamation? Well, I'm just a home gardener and I've always thought potatoes never had any finer feelings and were content to be stuck in the ground and look for help from above. I might add I've never had any real response except above ground. Now potatoes are not esteemed successful by the size of their bushes. Their real value consists of what goes on down below in the soil. Last year I planted a few rows. To put it in the fewest possible words, I punched a hole in the ground and inserted a small potato. They were spuds, nothing more. A month or more later, the bushes which resulted, having been de-flowered at times, began to age and turn yellow. Having been told by a wise guy that the hour was at hand, I pushed a fork into the ground and prepared to uncover my buried treasures. Honesty forbids exaggeration for the results were disappointing. I know of no milder word than disappointing. If my vocabulary included one I would have used it. I now pass over to my conversion into organic gardening. To me it is a new religion and when I say religion, I mean just that.

So this year I went at it differently. No fancy seed potatoes, mind you, but small specimens purchased at a vegetable market, and these I planted whole into a forty foot furrow after having thoroughly mixed ten shovelfuls of compost with the soil. This was well mulched with grass cuttings to keep the ground cool and loose. In due time I dug out of a forty foot row, a full sack of beautiful clean potatoes—no peewees whatever, but sound and without blemish, exceeding in number what I gathered from ten rows planted last year without the compost treatment. I still have two later plantings treated as religiously as my first row and I await with confidence an equal success.

Table leavings and kitchen cuttings now have their place in a new project. Whereas such tidbits are usually shoveled into a galvanized iron pail as garbage, I now process them into high-class compost. They get the business in half a dozen outsize pottery chimney-flues. I up-ended them each upon a cement tile and in the bottom placed four inches of choice compost. Upon this bedding I placed a thick layer of kitchen and table leavings and over this I sifted

(*Continued on page 8*)

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THE ONLY TRUE LIQUID FISH FERTILIZER and ORGANIC PLANT FOOD

- Promotes Growth of FLOWERS, LAWNS, BUSHES, VEGETABLES, POTTED PLANTS..
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NASH Choker Loop TRAPS

What's New AT HOME AND IN THE GARDEN

Vermiculite Pottery

A house plant container, which is so light it floats on water, has recently been developed.

It performs the same functions as the old clay pot, only more effectively. In addition, it has the advantage, of artistic design, eliminating the need for wrapping the pot with

crepe paper or placing it in another container.

Taking the place of metal and glass containers which do not allow proper aeration for the soil and root systems of plants, the new pottery, made porous by use of vermiculite, answers the need for a house plant container which is attractive and decorative in the home, yet one in which plants will thrive.

Because vermiculite, a mica-like mineral composed of thousands of microscopic air cells, was utilized in the manufacture of the pottery, the container has the capacity to release the water in the pot gradually over a long period of time, the soil will not become water-logged, thus preventing the stagnation and souring of the soil.

The containers are made in three colors—pastel shades of green, rose and blue. Vermiculite Pottery, Inc., P.O. Box 991, Atlanta, Ga.

Fulcrum

Almost every year sees improvements in agricultural implements, but until recently nothing had been done to improve the principle digging tools of the manual worker. The Keston fulcrum is an invention designed to revolutionize the hardest part of the gardener's work—digging. At the same time, it permits the organic gardener to follow one of the most intelligent tenets of his creed—never to invert the soil.

With the Keston fulcrum, soil may be completely loosened and aerated, and weeds removed, with the topsoil staying where it belongs while compost or other supplementary organic matter is permitted to trickle down to lighten and improve the subsoil. There is no lifting involved. The tines of the fulcrum are pushed into the ground, the handle of the fork is pulled back until the fulcrum hits the ground and the load is suspended. As it begins to break up, the handle is returned to the upright position. This device can be used to break up fallow land or for removing deep rooted plants without lifting. Organic Implements & Products Co., P.O. Box 105c, Haddon Heights, N. J.

Multiwall Package

To prevent depreciation of their product in storing and shipping, the Hyper Humus Co. has developed a new package that assures the customer of a quality product. Hyper Humus, a natural soil organic, is now available in a durable multiwall bag that is moisture proof and grease proof. Extensive tests have shown that this soil conditioner remains moist in the bags, that there is no loss in weight over a long period, and that extremely rough treatment causes no appreciable damage. Sizes of the bags are 20, 50, 80, and

100 pounds, and they may be ordered in mixed carload lots when desired. Hyper-Humus Co., Newton, New Jersey.

Step Saver

A new garden hose valve, called the Step Saver, designed to be inserted in a garden hose near a sprinkler head so that the water may be turned on or off or regulated without walking back and forth to the valve and the house or kinking the hose, has recently been announced.

The step saver valve is small and compact and very simple to install. It is only necessary to cut the hose just outside the range of the sprinkler head, insert the serrated ends of the valve into the hose and bend the clamps that are a part of the valve firmly onto the hose. The present model fits all standard 5/8" inside diameter. According to the manufacturer a second model is being developed which will fit all types of plastic hose.

For further information write to Winona Tool Manufacturing Company, 1430 West Broadway, Winona, Minnesota.

Hobby Tool

The Hobby Tool, light-weight, powerful handgrinder, has recently been announced by The Dumore Co. A low cost tool, it can be used as a handgrinder for plastic carving, model building, shop use or work

around the house. With it the hobbyist can sand, grind, saw, drill, engrave, buff, polish, burnish, sharpen, carve, burr, and shape. It features push-button lock for instant no-wrench tool change, handy thumb switch for split-second control and engineered shape and balance for increased ease of handling. The Dumore Co., Racine, Wisconsin.

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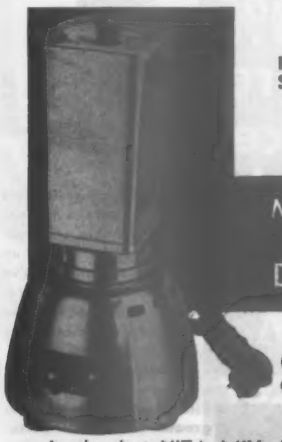

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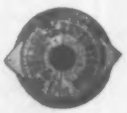

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Forum

(*Continued from page 5*)

an inch of garden soil. Then a spoonful of an activator, in this case Activo, which I stirred with a stick. In due time another thick layer of so-called garbage, then more earth with spoonfuls of Activo well mixed. The aforesaid flues are better than thirty inches in height and upon the upper end I placed a cement tile.

In four weeks all semblance of garbage had disappeared, with the exception of egg-shells and avocado seeds. The residue is a black compost smelling exactly like rich wood-earth. Does this sound good? Well, friends, sound has nothing to do with it, but bacteria-loaded compost such as this can work wonders with a starving plant.

Eleanor Thomas
North Hollywood, Calif.

A Sun-Heated Greenhouse In New England

Some of your readers will be interested in an experiment which we conducted during the recent winter. We have a greenhouse, 6 by 18 feet, built as a lean-to against a south-facing stone and concrete wall. The greenhouse has single thickness glass dies, and single thickness coldframe sash on top. It is unheated, save by the sun.

In September, 1949 we planted some black seeded simpson and some oakleaf lettuce seeds outside in the garden. After a month, when hard frosts began, we transplanted some of the young lettuce plants into cold frames and into the greenhouse. In each case we had about 2 inches of compost, worked lightly into the surface of the soil.

The lettuce plants in the greenhouse grew rapidly. Those in the coldframes more slowly. By mid-November we had consumed all of the lettuce originally transplanted into the greenhouse. Then, on a warm day, we changed the compost in the greenhouse and transplanted the best of the lettuce plants from the coldframes to the greenhouse. We set them in beds of about 8 by 8 inches.

We had a stormy, moderately se-

vere New England winter, with frequent below-zero temperatures, going to 22 degrees below zero on several occasions. For a part of the winter, the top and sides of the greenhouse were covered with snow and ice. Lettuce cut under these conditions of severe cold was frozen stiff. When plunged into cold water it wilted and did not revive. But if we waited for a warm day, the lettuce was thawed out and stood in the greenhouse crisp, dark green in color and when eaten was of excellent flavor.

We picked this lettuce all through the winter on warm days, eating the last of it at the end of April, seven months after the seed was planted.

It is quite possible that the surface dressing of compost on the greenhouse beds helped to bring the lettuce through a Vermont winter. If we can duplicate this experience during subsequent winters we will have found a source of home-grown fresh greens available the year around.

Scott Nearing
Jamaica, Vermont

STATEMENT OF THE OWNERSHIP, MANAGEMENT, AND CIRCULATION REQUIRED BY THE ACT OF CONGRESS OF AUGUST 24, 1912, AS AMENDED BY THE ACTS OF MARCH 3, 1933, AND JULY 2, 1946 (Title 39, United States Code, Section 233)

Of ORGANIC GARDENING published monthly at Emmaus, Pennsylvania for October, 1950.

1. The names and addresses of the publisher, editor, managing editor, and business managers are:

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Managing Editor—Dr. Wm. H. Eyster, Emmaus, Pa.

Business Manager—J. I. Rodale, Allentown, Pa.

2. The owner is: (If owned by a corporation, its name and address must be stated and also immediately thereunder the names and addresses of stockholders owning or holding 1 percent or more of total amount of stock. If not owned by a corporation, the names and addresses of the individual owners must be given. If owned by a partnership or other unincorporated firm, its name and address, as well as that of each individual member, must be given.)

Rodale Press, Emmaus, Pa.—J. I. Rodale, Rt. 2, Allentown, Pa.; Robert Rodale, Rt. 2, Allentown, Pa.; Ruth Rodale, Rt. 2, Allentown, Pa.

3. The known bondholders, mortgagees, and other security holders owning or holding 1 percent or more of total amount of bonds, mortgages, or other securities are: (If there are none, so state.) NONE.

Signed, J. I. RODALE, Publisher

Sworn to and subscribed before me this 12th day of September, 1950.

Elmer A. Barto, Notary Public
My Commission Expires Jan. 7, 1951

Deep Mulch on Potatoes

Would say that last year I mulched my potatoes with a foot of hay and never touched them until I dug them, and I had the finest potatoes I have ever had. All were very smooth.

Harlan J. Desoe
Rowe, Massachusetts

Mulching Gave Wonderful Results

I have always been an organic gardener, as that is the way my father taught me. I have got some good ideas from the *Organic Gardening*, magazine, and one of the best is mulching. I sure had wonderful results after mulching my morning glories, sweet peas and seed dahlias, and I plan on mulching the vegetable garden this summer.

Mrs. James Gillis,
Route 1, Bannister, Mich.

Oak Leafmold for Roses and Apples

We are building our own house — so last year we didn't have much time for the yard. During midsummer I planted a favorite rose slip, but in a few weeks the leaves had died and only a small green section was left on the stem. So to experiment I filled the hole around it with oak leaves, then covered them with rocks, in no time the oak leaves had turned to black loam and it made watering necessary only about once a week. In no time new growth and leaves started, and by September it had three blossoms and the frost got several buds. In late spring we transplanted several fruit trees. One apple looked determined to die, the few leaves were small and curled up. I didn't give it much hope, but used the same method as with the rose. It soon had a gown of new leaves, and you have never seen such beautiful, large, green leaves. After all the other trees had lost their leaves in the fall this tree still had its leaves, as pretty as ever. It still had four green leaves on it in December when there was a foot of snow around it.

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by FRIEND SYKES

TELLS how 750 "worthless acres" were changed into rich farm land by use of the organic method. Filled with graphic descriptions, illustrations, recommendations for making pastures, reclamation of waste or derelict lands, and increasing the water-holding capacity and productivity of the soil. The value of mixed farming and reforestation, the importance of the earthworm, and the mechanization of the compost method are all clearly explained.

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As a result, the cattle and horses were maintained in health and vigor that had been hitherto unknown, and the land is now visited by outstanding agriculturists as one of the most interesting farms in England. 416 pages, 40 photos. **$4.50**

Research in the ORGANIC METHOD

By RUTH RODALE

Success for Greensand

This month we are publishing the happy results of granite dust field studies at the Connecticut Experiment Station. A valuable potash fertilizer is finally beginning to receive the recognition that it deserves. Another potash rock, greensand has been used for literally centuries over parts of the Atlantic seaboard, particularly in New Jersey. For this reason it was surprising to me that we had found little governmental work on greensand as a fertilizer. With little research we came across just what we were looking for. In 1918, True and Geise (Journal of Agricultural Research) proved in extensive experiments that greensand provides potash requirements as good or better than commercial fertilizers. They discovered that yields were often greater even where small quantities of greensand are added compared to the yields from normal dosage of commercial fertilizers. The more greensand used, the greater the weight of plant tops. But when commercial fertilizers were added, the largest weight of tops almost invariably turned out to be grown with the smaller concentrations of the fertilizer. True and Geise attribute this fact to the toxic action of excess chemical potash. Be sure to add greensand to your list of essential fertilizers.

DDT Found in Water Supply

The Wilmington, Delaware area was ready to be sprayed with DDT for protection against flies thought to carry poliomyelitis, in 1947. The Water Department was assured by public health officials that no harmful concentration of DDT would accumulate in water reservoirs from airplane spraying. But within a few days after the DDT spraying started, a cloudiness was noticed in the reservoir water. According to *Water Works Engineering*, December, 1948, microscopic animal life in the reservoir had been practically killed off. The cloudy condition of the water was due to the unchecked multiplication of plant life, minute algae called Synedra. The biological balance of the water had been disturbed by the toxic DDT. Although the DDT concentration was not high enough to destroy the algae, the water became dangerous for human consumption. "After a shutdown of the filter plant, the water receded and a portion of the walls was exposed and became dry. The exposed area was covered with a white, crystalline material and gave the appearance of having been whitewashed. The material scraped from the walls and intake pipe was found, on analysis, to be DDT. This was the first clue to the cause of unbalanced condition existing in the water. It was difficult to realize the heavy contamination of DDT which this reservoir had received from the spraying."

Is Sewage Sludge Safe?

To bacteriologists, sewage sludge is considered safe if the bacteria, *Escherichia coli*, one of the hardiest organisms in the human intestine is not present. Bradley in the Massachusetts Experiment Station Bulletin 453 reports that *Escherichia coli* (*E. coli*) "will disappear in a few weeks from sludge in a filter bed, making it highly probable that any pathogenic intestinal bacteria present would disappear more quickly because they are less hardy than *E. coli*." But bacterial contamination is not the only danger in using sludge as a fertilizer. Think of the caustic chemicals that must pass into sewage systems of large cities. Only when you know your sewage sources can you be really sure that continual application will not damage your soil.

DO YOU COMPOST?

Want to improve your garden at no more expense and with less trouble than ever before?

Read these amazing facts about Q. R.!

Whether you compost or not, here is something you must know. Compost is Nature's way of fertilization. It is made from matter which was living. And all you need is the usual **waste** you derive from plant or animal materials — if you use Q. R., of course! For the secret of this activator is in its formula, a combination of seven herbal ingredients. Q. R. acts as a catalyst —helping to start Nature's process of reduction and decay, and in a time as short as 12 WEEKS, you may obtain the best soil food in the world. No harsh synthetic chemical fertilizers and **no smells**. Q. R. is clean-working and **easy to use.**

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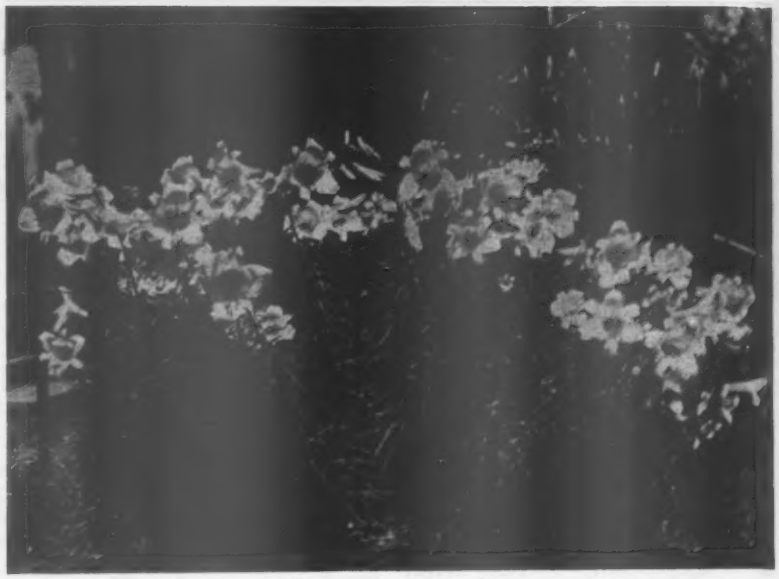

Regal Lilies

MULCHED LILIES

Lilies prefer the mulching method.

By ROY A. MONSAT

THE Regal lilies shown in this photo are grown without any cultivation at all. There are no weeds. The soil is yellow sand down at least 50 feet and not very fertile. Within a few feet is a steep bank down about 15 feet.

All that is done with these lilies is to mulch them heavily with leaves, to a depth of some six inches. As these leaves settle down and become humus, more leaves are added gradually.

In the spring if the leaves are matted they are loosened or "fluffed-up" to let the shoots through, but they are pointed and come through pretty well by themselves. Care must be taken not to injure them as these new shoots are tender when just starting to grow.

I have developed several strains of pure white Regal lilies which bloom at different times, so I have this lovely, very fragrant flower in bloom for a full month, all of July and into early August.

The usually considered temperamental or "fussy" Madonna or Candidum lily grows very nicely nearby and is not a bit cranky — is pure white, very fragrant, but has much smaller blooms with more on a spike than the Regal lily.

Perhaps the extra good drainage is the reason why lilies do well here, but I am sure that the leaves are an important factor too.

This may be a "lazy man's" way of gardening, but it works. It keeps the soil moist, cool and open or porous.

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Chopped Leaves for Mulching

During the 1949 season my exhibition type chrysanthemums, gladiolus, sweet peas, and other plants were mulched with 4 to 5 inches of chopped leaves. In spite of the drought my blooms were larger and my plants were healthier than those of my neighbors. As soon as my plants were several inches high I spread compost on the top of the ground and then covered the entire garden with chopped leaves. No artificial fertilizer was used.

My plantings were in a sheltered location and they were so close together that I am sure that the wind did not blow any of the chopped leaves away. In the late fall the plants were cut off and dug up and it was then noted that less than 1 inch of chopped leaves remained. The remaining leaves were still spongy and they were not packed down. It is very evident that my soil had digested the compost and leaves.

Leaves from 6 trees have been used by me for 10 years; first on rhododendrons and other shrubbery, and then as a mulch on the garden. I started out using the leaves whole but they matted down, took up to 2 years to decompose, and looked very unsightly.

Chopped leaves spread over the garden as a mulch present a pleasing appearance, eliminate the need for weeding and cultivating, hold moisture, prevent the soil from drying out, and keep the soil in a mellow condition.

Carl H. Spatz

Home Flour Mills

In the May issue of this magazine appeared an article on Threshing and Home Flour Mills. In this article, various kinds of mills were described and dealers who handle the mills were mentioned. Unintentionally, the Organic Implements and Products Company, Haddon Heights, N. J. was omitted. This company handles hand-operated and power grist mills for making whole-grain flour and the grinding of coffee, spices and other dried materials.

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Answer to Our Critics
(PART II)

Is There Enough Organic Matter?

By J. I. RODALE

IN THE last issue I answered in part an article written by Professor Ray Koon, head of the Waltham Field Station of the University of Massachusetts, which was published in the May, 1950, issue of *Horticulture* magazine. Professor Koon attacked the organic method by merely making a few brief statements with no attempt to prove any of them. It was the most disheartening and unscientific piece of writing I have ever seen. In the September issue I attempted to show that Professor Koon was making these charges without having thoroughly studied the organic method. He claimed that this method took in only the use of organic matter, overlooking that we also recommend ground phosphate and potash rocks. He also stated that the use of chemical fertilizers was not a factor in reducing human health. I produced much data to refute his assertion. We now start from that point.

The next statement that Professor Koon makes is, "And we don't relish the thought of starving to death during the experiment. And that is exactly what would happen, for there is just not enough organic matter to go around." Here the same error must be considered, that is, that Professor Koon overlooks the fact that we have at our disposal large quantities of potash and phosphate rock, so that our need for organic matter is lessened. In the early days of the organic method when we did not know about rock products, and were dependent entirely on organic matter for fertilizer, it was more of a problem. It meant that each farm had to be a balanced unit, and had to have some kind of animals to furnish manure. Eventually this would have led to a demoralization of the prices in the meat marts, for the law of supply and demand would operate to bring prices far below costs. If the farmer wished to work under the organic method, he would then have had to keep his animals mainly as a source of manure. But with the provision of these ground rock fertilizers, and with the growing of green manure crops which are plowed under to furnish some organic matter the problem is much simpler. Animals on the farm are important and worth while but they are not a matter of life and death.

We must not think, however, that because we grow green manure crops, we will have sufficient organic matter, for it has been shown that with some exceptions such crops as a rule will merely maintain the status quo as far as organic matter is concerned. They will not result in an increase over the years because of heavy croppings that go off the farm. But since we usually start with farms that are low in organic matter we then must build up the humus in the soil in some way. One method of doing it is by having some animals. In addition, the organic farmer must make sure that he conserves all residues of plant matter that originate on his farm. On many farms not a thought is given to the break in the cycle, when straw or corn cobs are not returned to the soil. It is the law of return which must be observed if we wish to maintain the optimum fertility of our lands. It is sad to see large dairy farms selling their manure when they should use it in the growing of their own crops. Instead, they purchase concentrates, some of which are not fit to be fed to pigs, as far as their nutritional value is concerned.

For the best way to get results and increased yields with the organic method an attempt should be made to bring in some organic matter that originates outside of the farm. Professor Koon says there is not a sufficiency to go around, but he has not made a detailed study of it. No one has. What do you base your point on, then? Since the Dept. of Agriculture has known about the claims of Sir Albert Howard for more than ten years, and since the amount of the available organic residues is an important factor in its consideration, it is strange that it has not made detailed surveys. In considering this aspect of the subject we must bear in mind that once the organic matter is built up then it would no longer be necessary to bring in the outside organic matter. This might take about 20 years. After that by good farming methods, we could maintain the organic matter content of the soil. This would include the use of potash and phosphate rock, good rotations, the growing of the right kinds of green manure crops, having some animals and using all the organic wastes that originate on the farm. We must remember that a green manure crop growing on a farm whose organic matter content has been built up over a period of 20 years, would furnish more organic matter and nutrients than one on a farm that is low in organic matter.

One might ask, "How can you add to the soil by merely growing a crop

in that very same soil?" In other words, you take something out of the soil and merely put it back. But there is more to it than shows on the surface. A growing plant gets far less than 10 per cent of its nutrients out of the soil. The remainder comes from the air. Large amounts of carbon dioxide, nitrogen, etc, are obtained from this source. In many regions as much as 25 pounds per acre of sulphur fall onto the soil per year, which is almost sufficient for the needs of many growing crops. By the multiplication of Azotobacter organisms in the soil, through the building up of the organic matter content, more nitrogen is obtained from the air. By a defeatist attitude, leading to a waste of organic matter and the use of the concentrated chemical fertilizers, there is a reduction in the type of bacteria that can extract nitrogen from the atmosphere. What I mean by a defeatist attitude is that because people like Professor Koon believe that there is not sufficient organic matter to go around, then they make no attempt to use the amount that *is* available. As a result there arises a situation which occurred a few days ago. It was haying time and due to the rains there was much hay spoilage. One farmer called us and asked if we would call and remove without having to pay for them 100 bales of spoiled hay, as it would save him the labor and time of having to burn them. The next morning another farmer called and offered us 50 bales under the same terms. We gave them each a free subscription to the *Organic Farmer* so that if the same situation occurred in the future they would know how to make use of such valuable organic matter. What we did with this hay was to run it through our ensilage cutter, which shredded it somewhat, and with our manure spreader we then applied it thinly over a growing crop of clover which we are going to plow down next spring for planting corn. This is the way the new organic method operates. Under the old method we would have used this material in compost pits. One of the advantages of the new method is that it does not require the time to apply the compost in the spring when time is short to get the crops in.

As I have said above, no attempt is made by farmers to get valuable organic matter which is free for the taking and even when it is dumped right into their lap they don't know how to handle it. Last fall my two men with the use of a dump truck gathered 100 tons of leaves, which are easily worth $10 a ton. Here is a thousand dollars worth of material which cost us about $75 in labor, part of which when ground up was applied in a field where soybeans were planted last spring. There is an enormous amount of leaves available in the fall, much of which is burned up. I have never heard of a county agent advising farmers to go after this type of material.

There is much industrial organic waste available that the farmer is not aware of and that could add to his income in a material way. In the South one sees mountains of sawdust at saw mills, much of which is burned up. This is valuable fertilizer material containing many of the needed soil nutrients and hormones. There is leather dust from shoe factories, brewers hops available in large quantities, spent mushroom manure, cocoa wastes, cotton gin wastes, apple pomace from cider mills, cannery wastes, castor pomace, coffee wastes, eggshells from hatcheries containing much in the way of animal matter, felt wastes from hat companies and other wastes from textile mills, grape pomace, fish wastes, etc. A large farm that has a substantial yearly bill for chemical fertilizers can take the savings from adopting the organic method and apply it to the organization of a separate department with special equipment to secure and properly handle such waste organic matter. It might economically pay for a truck to go long distances to obtain such material, much of which can be obtained free.

Take the case of the water hyacinth that is blocking many of our waterways in the South. Government authorities in seeking ways to clear such impediments completely overlook the value of such green matter as a fertilizer, and as a result the methods they develop destroy this valuable weed, while at the same time the soils of nearby farms are seriously suffering from lack of organic matter. A survey should be made by the Government as to how much of such kinds of plant matter is available, including other kinds such as Spanish moss, seaweed, etc. And in the realm of Government jurisdiction it is tragic when we see how many surplus crops are destroyed in order to keep prices up. We see tons and tons of potatoes that are ordered to be destroyed by the government, while the farms that produced those very same crops use nothing but chemical fertilizers. One of the reasons for such sinful waste is the lack of knowledge and experience in handling such surplus material. Being busy experimenting with artificial fertilizers and considering anyone who goes out of his way to secure waste organic material as some kind of a fanatic or crack-pot, they are like babies when some such organic material comes their way and would rather burn it or give it away because of that lack of knowledge. Business establishments could never continue to exist if they were run on this basis. Witness the big packing companies who are reputed to use every part of the pig but the squeal. But the farmer, who raises pigs and who should know better, allows large portions of his product to be wasted.

In the last few years a new development has taken place in the large scale composting of garbage and sewage wastes. A man like Mr. Joseph W. Frazer of the Kaiser-Frazer Company has entered into the picture and now has a huge digester at the Chicago Stockyards which turns manure into compost within a few days. He is signing contracts with municipalities to do the same with garbage. G. H. Earp-Thomas is also working in this field as well as a few others, including Dr. Ehrenfried

(*Continued on page* 54)

PLANT NEW IRIS FOR GARDEN COLOR

Brighten the garden corners with iris.

By GEDDES DOUGLAS

IRISES are very adaptable to varying conditions. They grow from Maine to California and from Florida to Minnesota. The family of plants known as the genus iris is a large one and boasts members that thrive in shade and sun, in swamps and desert. The type more often found in American gardens is called the Tall Bearded iris. By reason of its adaptability to all types of soils and climatic conditions, it usually labors under a great handicap. Gardeners are prone to half starve it and subject it to all sorts of neglect.

The culture of irises is similar in most respects to the culture of other hardy perennials. They need food and plenty of it. Their roots range near the surface of the soil and rapidly deplete the soil of the available food put there by nature. These elements should be put back into the soil and the ideal time to do this is late summer when the plants are divided and replanted. The two best fertilizing agents for bearded irises are bone meal and well rotted manure or compost. In general the use of inorganic fertilizers should be avoided.

Ordinary garden loam seems to suit the bearded iris. They tolerate either a limited amount of acidity or alkalinity. Transplanting can be done any time after blooming season but late summer seems to give the best results. Clean, healthy rhizomes should be selected and the top leaves of the fan cut back to conserve moisture. In planting the roots should be spread out and the top of the rhizome covered with soil to a depth of half an inch. Clean cultivation, sunlight and air circulation around the plant is advisable during the growing season.

Winter Care

In regions north of so-called Mason and Dixon line it seems desirable to cover iris in the winter with a thick mulch of leaves, excelsior or salt hay. This prevents heaving and minimizes the damage which might be done by sudden drops in temperature. The embryo bloomstalk in the top of the rhizome is formed in the fall previous to the blooming season.

Bearded Iris

Bearded irises need sun and good drainage to keep them healthy. Their diseases are few and can be prevented or controlled with reasonable care. In some sections of the country the iris borer is a pest of first magnitude.

People who have not followed the recent advances made in hybridizing irises are usually amazed at the new colors now available. Flowers are larger, colors are clearer and new shapes and patterns will soon be within the reach of the average gardener. For a grand display of bloom no other flower can equal the iris. Try some of the newer ones. They will delight you with their ease of culture, amaze you with their incredible variety and thrill you with their sheer loveliness.

The following list of one hundred new varieties is grouped according to color, and is selected from varieties which have won recent awards of the American Iris Society:

Purple White Selfs

Cathedral Dome — Priscilla
Katherine Fay — Vigil

Whites With Yellow Influence

Miss Bishop — Sharkskin
The Capital

Whites With Blue Infusion

Snow Flurry — White City

White Plicatas with Red or Violet Markings

Confetti — Minnie Colquitt

White Plicatas With Blue Markings

Aldura — Blue Shimmer

Bicolor, White and Yellow

Pinnacle

Bicolor, White and Red-Violet

Extravaganza

Bicolor, Yellow and Red-Violet

Gypsy — Red Torch
Mary Vernon — Staten Island

Light Blue Selfs

Azure Skies — Helen McGregor
Cahokia — Lake Breeze
Distance — Lake George
Sylvia Murray

Iris Sharkskin in the author's garden.

Medium Blue Selfs

Blue Rhythm — Danube Wave
Chivalry — Seafarer
The Admiral

Deep Blue Selfs

Blue Ensign — Blue Glow
Gulf Stream

Pale Cream and Light Yellow Selfs

Amandine — Golden Ruffles
Desert Song — Song of Gold
Vision Fugitive

Bright Yellow Selfs

Berkely Gold — Cloth of Gold
Gold Spike — Spring Gold
Zantha

Orange Yellow Selfs and Bicolors

Gold Sovereign — Ola Kala
Rocket

Yellow with Red-Brown Markings-Plicatas

Fire Dance — Suzette
Tiffanja

Yellow (Standards) near White (Falls)

Gilt Edge — Mattie Gates
Misty Gold

Pale Shrimp or Shell Pinks

Cherie — Pink Formal
Pink Cameo — Twilight Sky

Light Orange-Brown Selfs

Ballet Dancer — Golden Russet
Juliet — Russet Wings

Deep Orange-Brown Selfs

Arab Chief — Casa Morena
Argus Pheasant — Bryce Canyon
Pretty Quadroon

Lavender Pinks

Chantilly — Fantasy
Dreamcastle — Pink Ruffles
Radiation

Light to Medium Rose-Red Selfs

Gypsy Rose — Sunset Blaze
Red Majesty — Three Oaks
Tournament

Bronze Red Selfs

Garden Glory — Ranger
Lights On — Sarah Goodloe

Bitones of Pink to Red

Oriental Bazaar — Pagan Princess

Light to Medium Violet Selfs

Lilac Lane — Helen Fitzgerald
Violet Symphony

Deep Violet-Purple Selfs

Black Banner — Master Charles
Black Forest — Vatican Purple
Vice Regal

Light to Dark Violet Bitones

Lord Dongan — Nightfall
Three Cheers

Polychromes of Yellow, Orange or Red

Cascade Splendor — Honey Flow
Daybreak — Rilla Gabbard
Sunset Serenade

THE SCENE CHANGES

Mulch gardening is being practiced on a wide front.

Reprinted from *Der Wendepunkt*, May, 1950, Zurich, Switzerland
(Translated by Edward J. Fluck, Ph. D.)

By DR. RALPH BIRCHER

"WE ARE currently working practically 100% with sheet composting, in that we now apply direct to the garden soil what formerly we took first to the compost heap. One cannot go wrong with this method"—so writes J. I. Rodale, the leader of the organic movement in America. Two and one-half years ago I had written him to ask what he thought of sheet composting and why, so far as I knew, it was not mentioned in his magazine. It seems to me that this method contains decided future possibilities for the humus movement and that it will win the uneven struggle with the "anorganics" (exponents of chemical fertilizing), because composting in heaps simply requires entirely too much manual labor to be practicable. I received at that time a very friendly and rather long letter, in which sheet composting was rejected on the principles of Sir Albert Howard. (*Editor's Note*:—I do not recall such a letter.)

How much the leaf has turned in the meantime! Following Lady Eve Balfour, Friend Sykes, and Newman Turner in England, J. I. Rodale has now too gone over practically unconditionally to sheet composting in the December issue of his periodical. Many of his followers seem to have not quite fully recovered from their surprise. But I believe that even Sir Albert Howard, were he still alive, would have decided in favor of it, and would not have been the last to do so either. (*Editor's Note*:—The three persons mentioned are still advocating the aerobic method of composting.)

However, it seems to me that the basic assumption of this method lies herein, that the organic trend in agriculture will suddenly and with significant swiftness and assurance be pushed to the fore. The enormous advantages of sheet composting directly in the field have already been set forth in this journal: no carrying of the composted material to and fro, no turning with the shovel—that alone makes this method of humus production very much more practical and economic in times of high wages and with customary agriculture under the market pressure of dangerous competition—but also no more brown fields lying idle in frost, rains, wind, and sun and spoiling in humus; furthermore they are space-saving and make possible the omission of several tillage operations.

One asks, naturally, whether the resulting decomposition is actually just as good as in heap composting. In a layer of no more than from 15 to 30 centimeters (5.90 to 11.81 inches) in thickness it is clear that the degree of heat will never be reached which is deemed necessary in a compost heap (60 to 70° Centigrade). Heat does not seem to play any considerable role here (for nowhere do I find any mention of temperature measurement in sheet composting). In spite of this, the green matter is assimilated quickly in the earth—apparently more quickly than in compost heaps—and seems to supply by no means less worth-while plant nourishment than in the roundabout way by compost heaps, rather on the contrary. How is that to be explained? A complete and careful discussion on the basis of experiments and measurements I have not been able to find in this connection, and I am wondering that this does not take place. We are still told to observe and consider. Known and observed again and again, however, is the astonishing power-to-digest superimposed organic material that is found in a humus-rich and living soil, especially when that material is fresh. Just lay a green leaf on the moist, rich garden soil and watch how quickly it merges with it! This is accomplished, naturally, not by any particles of earth but by tiny living creatures, which wander into the overlaid organic cover and literally devour and digest it.

Therefore, in some climates the green matter can simply be applied as sheet compost with satisfactory results if evenly distributed and settled down. The humus floor digests it from the bottom up. Prof Gustav A. L. Mehlquist writes about this in the June, 1949, issue of the *Missouri Botanical Garden Bulletin*: Correct sheet composting with 15 to 30 centimeters (5.90 to 11.81 inches) of

straw, green matter and leaves is the most useful skill which the gardener can learn today, in spite of all the numerous new things which in the last several years have been learned in the field of plant nourishment and hormone treatments . . . and Dr. Kenworthy, gardening expert of Michigan State College, has shown in experiments that sheet composting in the above sense doubled the produce of cherry trees. The cherry trees received no other type of fertilizer except for this sheet compost with half-rotted or undecomposed organic matter. The control trees received no such soil covering, but in its stead full manuring. The first group of trees produced not only a harvest of 100 per cent larger fruit, but one with a phosphorus- and nitrogen-content approximately 25 per cent greater and with a 30 per cent higher calcium content in the leaves! Sawdust as earth covering produced no increase in produce.

However, where the climate is rather dry, the mere overlaying of the soil with matter leads to insufficient decay and therefore to considerable loss. In such circumstances it is necessary first to shred the ground matter, straw, waste, or whatever it be, in order that it be laid wide open; then it must be mixed into the topmost layer of soil, as Faulkner has shown. This necessity openly exists throughout most of Switzerland. With this preliminary step (which is the surer, the more often it occurs) especially in situations in which the under layer is still insufficiently humus-rich and living, one gets a mixture that is fine and thoroughly moist, and one which will "digest" even in periods of continuing drought. As I see it, this is the method of the future, one which can attain unforeseeable significance. Even Rototiller, Inc. in Troy, New York, has now brought out handy small machines which correctly shred and mix together green matter of considerable size in this manner, and every few weeks similar small machines seem to reach the market. Those are indeed signs of a new age in gardening. The weighty question of breaking up the soil's lower layers seems, to be sure, not yet to have been solved by now available motor implements and equipment.

It is to be understood that with sheet composting no destruction of weed masses can be achieved, to the extent to which this is possible with skilled and correct heap composting. For this purpose, the seasonal using up of weeds growing in the bed and field is facilitated through small machines of this type, so that it is not left to be done at sowing time.

For the rest, heap composting has not been made utterly superfluous. For pot and hothouse soil a more complete and advanced decay is necessary, for which a small pit (near to the sheet compost) is expedient. That should preferably be a closed pit, as recommended by May Bruce in England and Selby in Italy. The necessity of access to air has been for a long time somewhat overrated, as has been recently stressed. Some oxygen must be able to enter, but a few crevices suffice for that need. In the Bruce system of Q. R. composting the material is run in layers, as it comes from kitchen and garden, into a box measuring 60 centimeters (23.62 inches) in width and height and 90 centimeters (35.43 inches) in length (smallest dimensions). It stands without a floor directly on level ground and has a cover. Its sides are double and padded with dry straw in order to cut down on loss of heat, and the compost material stays permanently covered with moist packing bags all the time that it is full. Approximately every 20 centimeters (7.87 inches) in depth one puts over the layer, in addition to powdered rock or calcium and some soil, a light application of the solution Q. R. Plant-Mixture (this plant-dust is now available in Switzerland from Mr. Andrea Giovanoli, Wiesenstrasse 8, Zurich). The compost then quickly attains a heat of about 70 degrees Centigrade, which, thanks to the Q. R. application, lasts for so long that the steaming hot material has time to fully decay. The Selby method is similar, and I hope to be able to give fuller details about it another time.

An *Organic Gardening* reader had success with the following simple experiment: he removed the ends of a metal barrel, filled in the bottom to hand-height with hay or peat and put in kitchen waste, as it came, then covered lightly with soil each time. The barrel he covered with a board and left the whole thing alone. The open bottom attracted earthworms like magic, and they then digested the kitchen waste. Applied in the case of the waste barrel, this would accordingly be the principle of sheet composting without heat-decay.

And now an incident which Rodale tells in *Organic Gardening*. Not long ago a delegation of leading people came to the United States from India. They wanted to study an artificial fertilizer factory, in order to establish a similar industry in India. Alas! Is now India, too, which for a long time has been suffering from severe soil erosion and terrible overpopulation, really going blindly along this one-sided way, after Sir Albert Howard conducted his organic plant-nourishment experiments there with such signal success, and Prof. Dhar, Allahabad, developed them further? The delegation also visited the experiment station of Rodale's "Soil and Health Foundation." The chief engineer is said to have been greatly impressed. But – he spoke as follows: "The whole world looks on the U.S.A. as its model. We in India admire everything which you in the U.S. do. You set the example for us with your great compost factories. We have been inspired by you!"

What a responsibility the hated and admired West wears! How much really depends on its "inspiration." The Organic Movement has no time to lose!

MULCHED GARDENS ON THE ORGANIC FARM

Mulches insure a living soil and healthy, fruitful plants.

By WILLIAM H. EYSTER, Ph.D.

MULCHING has been practiced in the gardens on the Organic Farm for a number of years. The results have been so satisfactory that this practice deserves special consideration by all gardeners. Mulching is practiced by nature wherever plants grow free from the interference of man. The woodlot and forest have a generous mulch of leaves, twigs, and such herbs as grow on the forest floor. The meadow and prairie have a mulch composed of the stems and leaves of grasses and other herbaceous plants. Even the soil of fields which have been farmed for a time and then abandoned soon are covered with a mulch composed of the remains of weeds. Weeds are nature's emergency plants for restoring as quickly as possible the holes torn in the earth's green carpet by man.

The advantages of mulching are numerous. The advantage which may be most appealing to many gardeners is the fact that mulching greatly reduces the amount of work involved in the care of the growing crops. No cultivation is necessary after a suitable mulch has been applied. Weeds are almost completely eliminated. The occasional weed which manages to grow through the mulch can be pulled out with little effort and thrown on top of the mulch. Neither the cultivator nor the hoe are needed after the mulch has been put down.

A mulch of shredded organic materials absorbs the rain and melted snows more or less completely, and thus insures an abundant supply of water for the growing crops. Mulches also conserve the water in the soil and do away with irrigation that might otherwise be necessary. Mulches protect the soil from the heat of the sun. Mulched soil is cooler in summer and warmer in winter, because the mulch serves as a thermal blanket over the soil. Even of more importance is the fact that a mulch prevents the alternate freezing and thawing of the soil in late autumn and early spring. The heaving of the soil often is so great that the root systems of many plants are badly damaged, or the plants may be more or less completely lifted out of the soil.

Mulches absorb rain drops and prevent the splashing of soil on the stem and leaves of the crop plants. In this way, such fruits as strawberries are kept free from splashed soil. Since many of the disease-producing organisms are transported from the soil to the plants by the splashing of soil when it rains, mulches play an important role in the control of diseases. Controlled experiments show that mildews and leaf spots can be fairly well controlled by maintaining a mulch over the soil.

Organic mulches, i.e. mulches of plant and animal residues, are food for the soil organisms. At the interface between soil and mulch, the latter is being digested by soil organisms and converted into compost and humus. Surface mulches are the most natural and the easiest sources of humus in the soil. They are inhabited by a great variety of soil organisms which convert them into minerals, vitamins, carbon dioxide, antibiotics and other products which impart to the soil a dynamic growing force that is transmitted to crops plants, enabling them to grow with such vigor that they are relatively free from disease-producing organisms and insects and other pests.

Organic mulches tend to retard the development of plants in early spring, and thus to protect them from killing frosts. Stone mulches, on the other hand, hasten the development of plants and thus bring certain vegetable crops into production from 10 to 14 days earlier than the same kinds of plants grown without the mulch.

Perhaps as another advantage of mulching should be mentioned the fact that it represents a simpler and more natural method of making compost. All of the products of decomposition are sure to enter the soil where they will become available to the growing crop plants.

Mulching Materials

The materials which have been used in the gardens on the Experi-

This vegetable garden is stone-mulched with rows running between the crushed-stone paths. During the summer months the stones are covered with a plant mulch to insulate the stones from the sun. In early spring, the exposed stones absorb heat from the sun and hurry the vegetables to maturity about two weeks earlier than those not stone-mulched.

mental Organic Farm include stones, leaves, straw, hay, corncobs, grass clippings, shredded bark, spent hops, and weeds. Winter mulches which are placed over plants as well as the soil, as in strawberry patches, must be loose and airy. Suitable winter mulching materials include straw, hay, salt hay, and similar non-packing mulches. They should be placed in late fall or early winter after the ground is somewhat frozen, and should not be removed in spring until there is evidence of new growth in the mulched plants. The finer parts of the winter mulch may be allowed to remain on the soil as part of the summer mulch.

Just as coarseness is a desirable characteristic of winter mulches, fineness is an important characteristic of summer mulches. To facilitate the distribution and to increase the effectiveness of summer mulches, the materials should be shredded. This is accomplished on the Experimental Farm with an ordinary ensilage cutter which cuts the plant materials and blows them on a wagon or manure spreader. For small farms and gardens, inexpensive power shredders are now becoming available. With these shredders, leaves and other non-woody plant materials can be reduced to such small pieces that they can be applied to the soil directly for mulching or for sheet composting.

In mulching plants, it often is important to select one kind of mulching material rather than another kind. For instance, for acid loving plants use sawdust, oak leaves, pine needles, and leaf mold. For the common vegetables, use shredded hay, granulated corncobs, shredded weeds which must be cut before they go to seed, shredded leaves, spent hops from breweries, shredded pea vines from the vinery, and similar crop residues. Shredded mulches pack just enough to control weeds, prevent the loss of water by evaporation, prevent erosion, and regulate the temperature of the soil.

The Vegetable Garden

The Organic Farm's vegetable garden is mulched with stones, with shredded plant materials over the stones during the hot summer months. This garden is rectangular in shape, and is divided into four equal parts by three paths filled with crushed stones across the smaller dimension. Each of the four beds is then marked out in rows which run at right angles to the paths. The spaces between the rows, which usually are cultivated, are covered with flat native stones laid as closely together as possible, as in a jig-saw puzzle. The row spaces, i.e. the parts of the garden not covered with stones, are from 8 to 10 inches wide and extend from edge to path or from path to path in the garden. The garden is so located that the rows run with the contour of the ground.

Any kind of native stones may be used, but the flat ones which are not too large are best. Before the stones are put down, the soil should be plowed and given a good application of compost, and the different pulverized rocks. Then dig the soil out of the row trenches to a depth of about a foot. Put about four inches of compost in the bottom of the

A mixed garden of flowers and vegetables. Note the crushed-stone axis paths and the stone-mulching between the rows. Petunias in the left foreground, followed by carrots, zinnias, and spider plants in the background. The stones used for mulching are flat native stones laid together like a jigsaw puzzle.

trench and fill the remainder of the trench with a mixture of three parts of soil to one part of compost to which the rock powders have been added.

The garden, made as outlined above, is permanent and is strictly a no-digging garden. When the crop from any row is harvested, the residues are gathered up, shredded and either put back on the soil or in the compost heap. The row space is loosened up with a light hoe, and a new crop planted.

The stone-mulched vegetable garden is from 10 to 14 days earlier in the spring. The stones absorb heat from the sun during the day and increase the soil temperature sufficiently to cause the vegetables to grow faster and to mature earlier than the same kinds of plants planted in the open field on the same day. The higher temperature of the soil can be avoided during the warm summer months by covering the stones with a plant mulch, as already suggested.

Practically every kind of vegetable that can be grown in this region has been included in the stone vegetable garden. Without exception, the vegetables grow rapidly and attain larger than usual size. It is not unusual, for instance, to have onions as much as five inches in diameter and beets seven inches across and so long that I hesitate to give a figure which seems fantastic. These oversized vegetables have the tenderness and richness in flavor of younger and smaller sized ones.

The Mixed Garden

This is called a *mixed garden* because it includes both vegetables and flowers. It is laid out and constructed exactly like the vegetable garden described above. From careful observations made during the past three years, it can be said that this garden has more insect visitors but fewer insect residents. The vegetables in the mixed garden show less insect damage than the same kinds of plants in the strictly vegetable garden. This would seem to indicate that there is a better biological balance in the mixed garden. A mixed garden is more in keeping with nature's practices. Nature's gardens, i.e. plants growing without cultivation, include several to many kinds of plants in some kind of balance or association.

The Truck Patch

Just beyond the stone vegetable garden is about an acre of ground which is used for growing all kinds of vegetables, and may be called a *truck patch*. Last fall the soil in this patch was covered with a layer of shredded plant materials of considerable thickness in accordance with the New Method first announced by Mr. Rodale in the December, 1949 issue of this magazine. This surface mulch absorbed and held all rain and snow, and prevented the soil from winter freezing. It protected earthworms and other soil organisms. During most of the late fall, winter, and early spring months, the soil organisms feed more or less actively on this mulch and reduce it to compost. The extent of this feeding can be determined roughly by the decrease in the thickness of the mulch.

Last spring, the mulch was plowed under. If sowbugs are common, it

A ring-mulched cherry tree. The mulch consists of shredded hay at the bottom and spent hops from a brewery on top. Around the trunk of the tree is a cylinder of quarter-inch mesh wire to protect it from rodents.

may be necessary to remove the mulch from the garden until the seedlings are old enough to resist these small tank-shaped animals. When the plants are well established, the mulch should be placed between the rows in a sufficiently thick layer to prevent the growth of weeds. When this has been done, there is no need for cultivating, hoeing, or other operations concerned with the growing of an unmulched crop.

The animal population of a mulched soil is higher than that of an unmulched soil. Since most soil organisms are beneficial, this is a desirable condition. For instance, snails often do much damage to plants grown in a cultivated soil but are never a problem in a mulched soil as they prefer decaying organic matter to plants. The decaying organic matter seems to impart a dynamic growth force to plants which is reflected in vigorous, healthy growth, and marked resistance to diseases and pests.

Included in this truck patch were potatoes, celery, peppers, egg plants, peanuts, corn, squash, sweet potatoes, tomatoes, carrots, beans, and other common vegetables. Every kind of vegetable in this mulched patch responded most favorably. The mulched plants were allowed to grow naturally. All such practices as pruning and staking were strictly avoided. The results in this patch indicate that naturally grown plants are more vigorous and more productive than those which are pruned, staked, and otherwise interfered with.

Four varieties of tomatoes were grown in both the stone vegetable garden and in the truck patch. Those in the stone vegetable garden were pruned and staked with iron-pipe stakes, while those in the truck patch were allowed to grow naturally. All plants were set out on the same day. The tomatoes in the stone garden had ripe fruits about 10 days earlier than those in the truck patch. But the basal leaves of the plants in the stone vegetable garden showed more or less damage by blight but not enough to prevent a bountiful crop of tomatoes, while the naturally grown plants in the truck patch showed very little or no blight.

The vegetables in the mulched truck patch are surprisingly free from insects and diseases. As yet we understand very little of what goes on in the soil and in the decaying mulch. There are indications, however, that biological balances are established which are favorable to the crop plants.

Fruits

The gardens on the Experimental Organic Farm include such fruits as apples, peaches, plums, various kinds of nuts, grapes, blueberries, and raspberries.

Fruit trees are mulched by loosening the soil under the tree as far out as the drip line or as far out as the branches extend. Each tree is then given both phosphate rock and potash rock at the rate of a half-pound for each square foot of soil surface. Then a mulch is applied in the form of a ring around the tree trunk extending from the drip line to about 18 inches of the trunk. Around the trunk may be placed clean gravel or sharp cinders to prevent rodents from nesting there. Mice can be discouraged by shredding the mulching material into fine

(*Continued on page* 60)

THE HUNZA VALLEY — The people and their land

This is the beginning of a series of photographs of the amazing Hunza country in Northern India, never before published. They have been sent to us by Ella Maillart, of Geneva, Switzerland. You will find scenes of agriculture, family life, daily habits, ceremonies, and the rugged Hunza terrain. The pictures are especially timely and tie in with the book *The Healthy Hunzas,* by J. I. Rodale, which relates their vigorous health to the organic farming practiced. The book is published by Rodale Press — Price $3.00.

Hunza Valley. On the path above the Hunza River, a drummer announces the arrival of the Mir. In summer the toga is worn like a loose cape. On the left bank: irrigated terraced, fields, and the Rakaposli mountain.

Kashmir. Hunza Valley. Castle of Baltit where the Mir lives in winter. In the background, the range rising to the west of the Hunza Valley with snow peaks, even in August. . . . Tiny terraced fields built on the spar of gravel limiting Baltit to the North.

Men of Organiculture –

LIONEL JAMES PICTON

(No. 5 in a Series)

By MISS E. B. KIRKHAM

FROM the moment of their birth, doubtless, the links of an invisible chain had been drawing together two outstanding figures of the organic farming movement. Only when both were well advanced in years did their paths cross, and the world is richer for their meeting. Their individual contributions to the welfare of the human race, moving steadily along the converging lines destined one day to intersect, were complementary the one to the other.

Ever since reading Balzac's *The Country Doctor,* Sir Albert Howard had felt an inner conviction that some day he would encounter such a man in the flesh. And it was only in the last decade of his life that he found his presentiment was justified on making the acquaintance of the Hon. Secretary of the County Palatine of Chester Local Medical and Panel Committees, Dr. Lionel James Picton, O.B.E., M.A., B.M., B.Ch. (Oxon), M.R.C.S., L.R.C.P. From that day on, the links of these two lives were interlocked: agriculture was wedded once and for all to medicine.

Dr. Picton had grown up in one of the best farming districts of England and famous for its cheese—the county of Cheshire. His boyhood home lay close to the main road leading from Liverpool to the fertile fields around Little Crosby north of that city. Day by day as he walked to school the boy's attention was irresistibly drawn to the teams of fine Shire and Clydesdale horses from the farms, which brought into the city the produce of the good earth and which returned in the evening bearing loads of manure from the Liverpool docks and stables. Many a child of a later and more mechanical age would have quickly forgotten the strong glossy horses amid the engineering wonders of a busy city street; not so the reflective mind of this boy who was destined to be one of the pioneers of preventive medicine. He watched the loads of rhubarb, potatoes, and celery carried in daily to feed an insatiable population; he saw the oats, hay, and straw carted for the draught horses of the Liverpool wharves; and he admired the skill with which the men of the fields stacked the dock manure on the lorries in flat-topped, sloping-sided heaps for their return journey. The picture became indelibly printed on his mind and, young as he was, he came to understand the fundamental fact that the wheel of life turns full circle – the vegetables of the morning were born of the manure of the evening through the action of the living organisms of the soil.

This knowledge, however, deeply planted as it was in the recesses of his mind received no accretions or illumination from the orthodox medical education to which the boy of Liverpool progressed. The medical student heard no mention, from start to finish of his training, of that source of all life—the top six inches of fertile soil that, unless destroyed by the rapacity of mankind, covers the earth. But Lionel James Picton was a student who thought out for himself the implications of his observations. He had travelled abroad and lived for a time, when in his twenties, in Naples. There he learned the local custom of burial, so different from the six-foot deep graves of an English cemetery. He saw in Naples the corpse, wrapped only in its winding-sheet and devoid of coffin, laid in the ground with a covering of no more than four inches of soil above it. He saw, one year later, the clean bones dug up and placed in a stone box which, with the name of the deceased on its side, would then be built into the wall of the burial ground. This ground inside the stone walls, which so quickly and cleanly consumed the soft parts of the corpse, was a fertile garden where roses bloomed in profusion. Here, to the reflective medical student, was an arresting development of that boyhood lesson of the manure carts and their message of the cycle of growth and decay.

Passing from his scientific studies to the public health examination which, among others, was required for the attainment of his university degree, the young man looked in vain in his text book for further enlightenment. None was there to

be found. It was only when, expressing a desire to carry out some research work on bone marrow and haematology, he asked the advice of Dr. Drysdale of St. Bartholomew's Hospital, London, as to the course of action he should follow, that there occurred what seemed at the time to be a minor incident, but which was to set Dr. Picton's feet irrevocably on the path which led at last to the fusion of his work and thought with that of Sir Albert Howard.

This incident, so vividly described in his book[1], must be quoted in Dr. Picton's own words. Dr. Drysdale's advice to his young friend was short and to the point.

' "Go to Dowson," he said; and "to Dowson" I went at Messrs. Burroughs & Wellcome's experimental estate at Herne Hill. I found it was a mansion of early Victorian days, still in the decayed splendor of its own grounds. A soap-box of soil on each side of the front-door steps depressed me. In what had been the best bedroom, now fitted up as a laboratory, I found Dr. Dowson, complete with white coat and microscope. "Bone-marrow, what about it? Phosphorized fat! Lecithin! " said he, swinging the iridescent contents of a large flash. "Compress it into a tablet, tell them it's good for their nerves, what?"—then, "Leave it: come and see something really worth while, something with the whole hope of the future." With white coat flying, he raced down the stairs and passed, almost at the double, through the hall and at the head of the front-door steps he turned. "There," he said triumphantly pointing first to one soap-box and then to the other, "What do you think of those?" Rather dumbfounded and recalling the uses to which these decayed great houses were being put . . . but reassured by the thought of the white coat and the microscope with its Zeiss oil immersion, after the split second occupied by those thoughts, finding Dr. Dowson awaiting my reply, I pulled myself together. Some worthy answer was expected and I was inadequate to the moment. "They look like boxes of soil," I said. "Right," said Dr. Dowson, "smell them! " Still with a trace of doubt, I stooped warily and complied. "This one smells, and this one doesn't." "Right again," said Dowson heartily. I was encouraged; but too soon. "Now," said he, "a guinea-pig is buried in each of these boxes, in one deep, right at the bottom, in the other shallow, just under the surface. Which is which?" I pointed to the one that smelled: "This is the one in which it is buried shallow," I said, "it is buried deep in the other." *"Wrong!"* he said, emphatically, "the other way round. Look! "—and with his finger-tip he brushed away some crumbs of soil from the surface of the box that did not smell. There sure enough, was the guinea-pig, not an inch buried. On humbly asking the explanation, "Find out! " said Dr. Dowson, smiling at me. "Where? " said I. *"Rural Hygiene,* Vivian Poore," said he, turning to fly up the staircase once again.

' "Something with the whole hope of the future"—the word recurred to me; and, straightway acquiring the book, I found as I read that the claim was just. Here were the true principles of public health with a vengeance—almost if not quite. The great merit of the book was the recognition and simplicity of the doctrine "that the proper destiny of organic refuse is immediate burial just below the surface of the soil." '

For thirty years and more those words of Dowson's were treasured and turned over in Dr. Picton's mind. Wherever possible, he put into practice Poore's methods of refuse disposal and, wherever this was done, he found with the crops grown, nothing but satisfaction. But, from the point of view of public health, "the whole hope of the future" remained a remote dream, and all the time he felt that some factor of safety was missing from Poore's system. Discussion of the subject with leading medical men, like contributions to the press, brought no headway. A few individuals practiced for themselves Poore's principles without attempting to enlarge the scope of their activities: others gave approval to the principles but regarded them as incapable of practice in the modern civilized world.

Yet the question still engaged Picton's reflective mind, and at last, in 1938, he came (by chance—or by invisible design?) upon a description of the Indore Process of composting published by Sir Albert Howard in the *Journal of the Ministry of Agriculture.* To Dr. Picton this was the key to the problem which had baffled him for so long: immediately he recognized that here lay that factor of safety missing from Poore's methods: this was the road to realization of "the whole hope of the future."

Meanwhile, with his colleagues of the Cheshire Panel Committee, Picton had been reviewing the facts of their medical experience in trying to follow both the letter and the spirit of the National Health Insurance Acts for "the prevention and cure of sickness." The cure, they felt, was being accomplished to the best of their ability, but what of the prevention? A careful review of the cases of sickness which they handled and a minute investigation of maternal mortality in Cheshire over a period of three years convinced them of two important facts: (1) that right feeding, even more than sufficient feeding, would have eliminated much of the disease they were called upon to cure, and (2) that this right feeding unquestionably involved not only the kinds of food consumed but also a factor of quality derived from the way in which those foods were grown.

Dr. Picton himself had watched over the course of years the development of an anaemic town-bred woman—whose first child, brought to birth with great difficulty, was weakly and lived no more than sixty hours—to a condition of abounding vitality. That she eventually became the mother of three other fine

[1] *Thoughts on Feeding,* pp 17, 18, published by Faber and Faber, Ltd., London, 1946. Published in U. S. A. under title *Nutrition and the Soil,* available at Rodale Press.

healthy children was due solely to the fact that, having become a farmer's wife, care was taken to build up her physique by a diet of wholewheat bread freshly baked with added germ, farm butter, abundant salads, grated carrot, barley, and unlimited fruit, all the fresh produce being grown with farm-yard manure only and no artificials.

The conclusions of this body of family doctors were finally given verbal expression by Dr. Picton, as Secretary of the Committees, in a document now known in many countries of the world as the *Medical Testament*. It set forth their unanimous conclusion that 'our daily work brings us repeatedly to the same point: "This illness results from a life-time of wrong nutrition" '. And it went on to illustrate this verdict with facts and figures of the incidence of four common ailments—bad teeth, rickets, anaemia, and constipation. It then quoted in some detail the findings of a great pioneer of nutrition, Major General Sir Robert McCarrison, C.I.E., whose work showed beyond all doubt that health and physique, in the case of certain classes of human beings as well as of experimental rats, was good, middling, or bad according as their diet was good, middling, or bad. Yet the diets of healthy races or tribes in different parts of the world vary considerably in composition and it was therefore apparent that some common factor underlying them all must be sought to account for the results to be observed. This, the Cheshire Doctors suggested, would be found to lie in its freshness, its wholeness, and also the manuring of the land where the foodstuffs were grown, and that this last factor involved the complete natural cycle of growth and decay without interruption or substitution of inorganic phases. This contention the research work and findings of Sir Albert Howard supported. The *Medical Testament* was signed by every member of the Cheshire Local Medical and Panel Committees, and under the enthusiastic and inspiring leadership of Dr. Picton was unanimously adopted on March 23, 1939, by a public meeting at Crewe of some six hundred people—farmers, county and local councillors, doctors, teachers, and clergy—conducted under the chairmanship of the Lord Lieutenant of the County Palatine and addressed by Sir Robert McCarrison and Sir Albert Howard in person.

That document will go down in the annals of medicine. The doctors of Cheshire could not concern themselves with its implementation through experiments in agriculture. Such a course obviously lay outside their province and had to become the concern of the pioneers of practical organic farming; but they acted upon their county's acceptance of the *Medical Testament* in organizing an annual garden competition amongst Cheshire cottagers and allotment holders, and in circulating information through the medium of the *News Letter on Compost*.

The important feature of the garden competition was insistence upon the sole use of Indore compost for fertilization of the soil. Nor did the judges inspect the produce only and make their awards on its merits; they visited the competitors' gardens and allotted marks also for their proficiency in compost making and their use of the land at their disposal. For several years the garden competition was a feature of much local interest and instruction until the increasing national difficulties of the war years caused its abandonment.

For more than four years from October, 1941, Dr. Picton, on behalf of the Panel Committee, edited and published three times a year the periodical known as the *News Letter on Compost*[1], which sought to illustrate by accounts of work in the fields of both medicine and agriculture that soil fertility is the basis of public health. This, in addition to the busy practice of a general medical practitioner, was no mean undertaking. By this time illness compelled Dr. Picton to relinquish his editorship, issues of the *News Letter* had grown in size from eight to sixty-eight pages and hundreds of subscribers had been enrolled and not in Great Britain only but in a number of countries overseas.

Four years after the adoption of the *Medical Testament* at Crewe, the Panel Committee published a further statement of the position they had taken up. In this they gave their considered support to Sir Albert Howard's thesis that the pests and diseases which attack plants are but the symptoms of something amiss in the natural cycle of growth and decay; that loss of disease resistance is the result of a deficiency in some essential quality, and that the most prevalent deficiency in present-day agriculture—in western countries at least—is a lack of humus; that unless full quality is maintained in the earth's produce, disease resistance cannot be conferred upon its consumers; and that the scientific attitude towards disease which concentrates on its control rather than its prevention is therefore fundamentally unsound.

Lionel James Picton had, as may well be understood, always been a staunch advocate of whole-wheat bread, and with characteristic thoroughness had taken pains to see and to understand the processes employed in modern steel roller mills. At his instigation, before the last war, a special "Fertility" bread of the whole grain with added wheat germ was baked and sold by certain Cheshire bakers and, when war-time regulations made the production of this bread impossible, he figured

[1]No. 13 only (published in October, 1945, under the editorship of Sir Albert Howard, C. I. E.) is still obtainable, price 2/- post free, from Miss E. B. Kirkham, The Rise, Milnthorpe, Westmorland, England; also a Supplement to No. 12—*Farming 750 Acres without Artificial Fertilizers* by Friend Sykes, price 7d. post free. All other issues are out of print.

In 1946 the *News Letter on Compost* became a quarterly journal—*Soil and Health*—edited and published by Sir Albert Howard. Two volumes of four numbers each were issued, followed after Sir Albert's death, by a special Memorial Number (5/- post free). Vol. I, Nos. 3 and 4, and the four issues of Volume II are obtainable from Miss Kirkham, The Rise, Milnthorpe, Westmorland, price 1/6d. per copy.

(*Continued on page 56*)

Zantedeschia Elliottiana — Golden Calla Lily

LILIES IN RELIGION

Lilies, rich in legend, are beautiful garden plants.

By ELEANOR McCONNELL

CAN anyone remember, or imagine a time, when they think the lily was not known? If they can, they must have a mighty vivid imagination, as the lilies have descended to us out of the mists of ancient civilizations that appreciated their beauty, for they are found decorating a Cretan vase, taking us back to 2400-1500 B. C. The Assyrians realized their beauty too, as can be told from some of their ancient monuments (around 700 B.C.)

The church has chosen the lily (Candidum) as the sacred emblem of St. John, the Baptist, St. Francis, and St. Anthony of Padua. It is not surprising that this lily, green, white and gold, should have become the flower of the Virgin, commonly used by the Renaissance painters, hence the name, "Madonna Lily."

The Madonna Lily appears to have been grown from earliest cultivation. One of the earliest illustrations is in a miniature in the Benedictional of St. Ethelwold of Winchester (10th century) The Saxon queen, Etheldreda, foundress of Ely Cathedral, is shown holding in one hand a book of the Gospels and in the other, a Madonna Lily.

It is interesting to know that a book was printed in 1470 which was the common source of information on natural history during the middle ages. This book was so popular it had fourteen editions! About the lily, it says, "The lily is an herb with a white flower. And though the leaves of the flower be white, yet within shineth the likeness of gold."

Another interesting English work of the 14th century is a medical poem with several copies still in existence. The writer states that he learned about the herbs and flowers from a book which he borrowed from a priest. Of marigold, he says it must be picked only when the moon is in the sign of the Virgin and the gatherer must say three Pater Nosters and three Aves. He also said, "Lilies, 'white as milk', should be plucked when the sun is in the sign of Leo, that is from mid-July to mid-August."

"The Mary Gardens" are among the most lovely of the Middle Ages, and are especially interesting as the illustrations of them embody so much of the old flower symbolism. This symbolism is of deep interest to all flower lovers. As early as the 8th century the Venerable Bede wrote of the white lily as the emblem

of the Virgin, the golden anthers signifying the beauty of her soul and the white petals her pure body. From the earliest times the lily, also known as the candidum, has ranked first in Christian flower symbolism. At first it stood for the celestial happiness, but the whiteness of the petals suggested purity and from the 12th century, the lily was invested in sacred art with this meaning.

Pictures of the Annunciation are curiously rare before the 14th century, but even in the earliest, the lilies are rarely absent, placed either in vases beside the Madonna, or as a wand in the hand of the Angel Gabriel.

The most famous medieval legend is associated with St. Catherine. In her vision of paradise, angels came to meet her wearing wreaths of white lilies. She wanted to convert her father, Emperor Costis. Until then there was no fragrance, but the scent was miraculously given and her father was thus converted.

A 9th century poem, "The Little Garden", written when Charlemagne reigned, vividly shows a picture of the old man, toiling in the garden. He tells of his struggles with the nettles, whose roots were "riveted like basketwork." He tells of the uses of the herbs: mint for the voice; fennel for the eyes; and "lilies for snakebite." And how beautifully he writes of his roses and lilies—"Better and sweeter are they than all the other plants, yes, roses and lilies, the one for virginity with no sordid toil, no warmth of love, but the glow of their own sweet scent, which spreads further than the rival roses, but once bruised and crushed, turns all to rankness. Therefore roses and lilies for our church, one for the martyr's blood, the other for the symbol in his hand."

The lily is hard to trace and was probably introduced in many countries before the crusades, for in many languages its old name is "cross of Jerusalem." An old Portuguese name is Cruz de Malta, possibly because the shape of the flower is suggestive of a maltese cross.

Lily—Vagabond

For several hundred years, 1500 to 1800, several varieties graced the gardens of the times and satisfied generation after generation Then, in 1862, that long reign of peace and contentment was destroyed by the intrusion of the golden-rayed lily of Japan (*Lilium Auratum*). When it burst upon the gardening world with bewitching beauty there was a great demand for it and other eastern lilies, even at large prices, but little was known of its cultural requirements and its failure was almost universal. This resulted in a serious setback for lily cultivation and for a long period lilies fell into disfavor.

The professional gardeners, however, were not easily discouraged and they found that these new lilies were not really capricious and difficult to grow, but that the difficulty was due to ignorance of their needs.

People of the far east have long appreciated their value as a food. Chinese, Japanese and Mongols boil and eat white-scaled lily bulbs as we do onions, or dry them and make them into cakes

In June and July lilies are conspicuous in California, most prominent being Lily Rubescens, the redwood lily, which has been called the most fragrant lily in the world. It has been known to grow 12 feet high and have 75 buds.

Here, too, in Humboldt county, heart of California's Redwood Empire, is found Lily Kellogi, a flower which opens pink, banded with yellow, changing to a deep rose-purple. It is said that this flower has been found nowhere else in the world.

In 1903 E. H. Wilson discovered Lily Regale. He sent about 300 bulbs to a floral company, who flowered them the next year and sold them under the name of Lily Myriophyllum. From that time we can date a general and gradual revival of interest in lilies.

Pineapple cactus

Night blooming cereus — Queen of the night.

Lace cactus

THORNS ALSO AND THISTLES

(Genesis 3-18)

A story about ornamental cacti.

By JANE GREEN

FROM the day that the Creator pronounced the curse of "Thorns also and thistles" against the earth, is a long time as we measure it. And since we have never known the earth's thornless perfection, we have learned to accept not only the "thorns *with* the roses," but *without* roses in many cases. While we may deplore the thorns, we find interest, beauty and even usefulness among the varied thorns and thistles besetting our path. For instance, one of the easiest ways to quickly grow some wonderfully interesting plants with blossoms as lovely as orchids or rare lilies, is via the thorny route of cacti.

Here in the southwest we can simply walk out in almost any pasture land and gather cacti for the taking. Always there are the *opuntia* group, "Prickly pears," to be found everywhere. I think, incidentally, that they are my favorites among all cacti, but I will not include them particularly in this article, as they might better be considered alone.

Another species very plentiful in this section is the dainty and *friendly* lace cactus. Although completely covered with spines, they are so fine and closely woven that they do not pierce the collector's hands. These lace cacti grow in family groups with many tiny little fellows nestling against the larger ones, which in blossoming time look like animated ladies dressed in sheer white lace frocks and enormous shell-pink satin hats!

When I had a gift shop several years ago, I used to gather very tiny lace cacti, pot them in green-painted thimbles and sell them for whatnot items. They will live quite some time in thimbles and may be transplanted to larger pots or put out doors.

The pineapple cacti, so-called from the spiral arrangement of their accordion-pleated ribs, are not so plentiful as the lace, but still they are not rare with us. At first sight, they might prejudice you with their fiendish fish-hook spines interspersed among many finer ones, but all of them possessed of *mayhem* possibilities. Once, however, you see them brighten forth in their deep yellow red-centered blossoms with long orchid-like petals, and their cheerful red fruit, you will give them respectful, if somewhat grudging admiration. You will never get chummy with them, though.

Another quite common variety is the familiar old "Devil's pincushion." It has spines so broad and tough they don't stick your hands easily, but stockmen hate them because they are tough enough to pierce cattle's feet. These are easily

handled, if gathered small. They grow very large and are heavy and awkward then. The blossoms are attractive and the pretty red fruit is as large as strawberries.

A veritable pearl without peer among cacti is, of course, the "Queen of the Night," the night-blooming cereus. I know of but one section of the state where these grow native and that is near the Mexican border in a rocky wasteland. I do not agree with the poet's lament of the wasted perfume in the desert air, for He who was pleased to call his creation "good" and who notes the sparrow's fall must surely note the ethereal beauty of a cereus blossoming under the blazing stars of a western sky, even though unseen by any human eyes.

A favorite with the children in the springtime is one of the nipple cacti with its edible fruit of appetizing peppers. It has no tang in taste, but looks just like small red peppers and children love them. It too is small and not difficult to transplant.

An established rock garden favorite in the Hill Country just a little further southwest from us, is the claret cup. Some plants have been enjoyed by one family for more than thirty years and each year has seen added "cups" of cheer in the shape of compact rosettes. Sometimes one plant has more than a hundred waxy cup-blooms ablaze at once on it in colors of scarlet to orange.

A cactus garden

Yuccas, everybody's choice, like the *opuntias* should be treated separately as there are so many varieties and uses of this well known plant. The plants are striking and ornamental from the time the first little sprouts appear, through the blooming season when the tall stalks hold up their magnificent burden of waxy bells of creamy tint, on to the fruitage of three-celled, banana-shaped seed pods filled with flat black seeds.

There are so many cacti to choose from that it would be difficult to tell somebody else which varieties he might want to start with. If you live where they don't grow wild, start with some of the tiny potted ones found in Woolworth's, or perhaps your florist's. Try only a few at first, and no rare ones until you know your cacti as well or better than you know your onions!

If you have no natural site for cacti, make a bed with good rock drainage, and set the cacti in ordinary soil. Water when set and then only occasionally thereafter. Cacti don't respond to pampering and will do better when left alone. I warn you, however, the subject will grow on you and before you know it, you will be breaking out with a sort of cactaceous fever, and you will know that the Spine-Goblin has got you for keeps.

Devil's Pincushion

From New York Horticultural Society — Boutrelle

Mrs. E. A. White

FLOWER ARRANGEMENTS
for the beginner

By ANN ANDREWS

THIS month we are outlining some of the necessary rules for those who would like to take the top ribbons in flower shows. There are three basic principles which are easy to remember and will serve as an excellent guide.

A. The height of your bouquet should be about one and one-half times the height of your container, if it is a vertical type. For a horizontal or flat container, flowers should stand at one and one-half times its width.

B. Place the large and the darker flowers at a low position in the container to develop a striking center of interest.

C. Try to create an effective design in your arrangements. You will see examples of two frequently-used designs, the crescent and the pyramid.

1. The crescent design of the chrysanthem beautifully into the curve of the baske begonia leaves hide the lip of the baske accenting the chrysanthemums. The bu smaller flowers are placed at the top and blooms placed low for correct visual b

2. The Mallard duck with cattails, laure and ball chrysanthemums represent th mid style. All the parts are exc blended, possessing variety of textu seasonal interest. This expertly contr rangement is completely natural in helped by the shallow pool of water.

Boutrelle

Mrs. Otto Langham *Boutrelle*

Mrs. Wilbur H. Deibert *Clewell*

3. Unusual containers, found in your kitchen, such as tin measuring cups can be interesting foils for chrysanthemum blossoms. Again we have an example of contrasting textures – the honeycombed mesh and cups against the delicate chrysanthemum petals.

4. Large dahlias as shown are lasting flowers if properly treated. Dahlia stems must be sealed immediately after cutting from the plants. Flaming the severed end gently with a cigarette lighter will do the trick with no injury to the flowers. These dahlias have been grown organically.

THE STORY OF A PLUM TREE

Mulching brought a backward tree into vigorous growth.

By E. J. ANDERSON

EVERYBODY sooner or later has the problem of some horticultural showpiece, a bush or tree or vine, which for some mysterious reason refuses to put on a show and instead becomes a rather tiresome object. With us it was a Red-leaved Plum (*Prunus Pissardi*), an ornamental that could be decidedly handsome early in spring, when the sun worked real magic with its wine-red leaves, but which lost most of its appeal later on in the season. On a small place such as ours this becomes a serious matter; every growing thing that does not contribute interest and beauty to the grounds wastes precious space and tends to spoil the general effect.

Tempted to dig it up, I hesitated for three reasons: (1) the memory of its springtime loveliness, (2) my inability to decide upon a replacement, and (3) lack of time and energy to struggle with a no doubt hardpacked soil and a tangle of tough roots.

Ravagers at work.

Last July the Plum tree became badly infested with black caterpillars. My reaction was that of the average gardener. Why did this have to happen to me? What do I do now? As I morosely watched the ravagers chewing away, I determined that they couldn't do that to my tree. I'd show them. Out in the tool shed there was a big boxful of poisons — just the stuff to cure those ornery critters of their over-eager appetites.

Then I remembered my recently acquired organic principles. I saw that I wasn't using my head. I was like a hundred other people in our neighborhood, who never ask why pests appear in their gardens. Their attitude probably is, "Pests just come, that's all. It's that kind of a world."

Sir Albert Howard and the editors of *Organic Gardening* fortunately had taught me the shallowness of such thinking. Whatever happens in the world of nature has profound rationality, even a visitation of insects. Insects, I have learned, are indicators that something is ill-adapted about our husbandry. Insects are a warning that we have been acting in ignorance or in defiance of natural laws, and that we had better amend our practices or we'll meet up with some surprises. Common sense applauds these tenets of organiculture. I had to recognize that it would be silly to treat symptoms — to protect my tree from parasites — and then do nothing whatever to correct the causes of its parasitization.

What were those causes? The organic school replied that though there might be other contributing factors, the basic cause nearly always is malnutrition. Malnutrition for which man is to blame. His mismanagement of the soil devitalizes the plant, lowering its resistance to internal and external enemies. Parasites are expressly designed to eat the tissues of abnormally-growing plants. Nature is a plant breeder who in this wise manner weeds out the unfit.

Confirmatory of this theory was the fact that our plum tree wasn't making anything like normal growth. Almost ten years old, it had the appearance of a two-year sapling. Its imperceptible growth had not worried us; we had preferred that a somewhat stunted, Japanese effect be created by this particular tree. But living things are intended to grow. What is wrong with it? I now asked myself. Something, surely. As our Red-leaved Plum evidenced no disease, its environment must be at fault. Very likely the tree grew in that horrible yellow or gray clay that results from cellar excavations; significantly, it was located on the edge of a built-up terrace whose subsoil I had found to be this infertile clay when, on former occasions, I had dug deep holes for new roses and grapes. I noticed something else that strengthened the malnutrition idea; grass grew all the way up to

the trunk of the tree. Such grass would rob any tree of water and topsoil nutrients.

Forced to make a decision about the tree, my sentimental attachment won out; I determined to save the plum if I could and see what it would make of itself in the years to come. The big question was: How should I try to save it? Synthetic chemicals, whether poisons or fertilizers, would do much more harm than good in the long run, I felt sure. Thinking it over, I decided upon both a direct and indirect attack on the caterpillars. First, I clipped off the twigs and small branches that bore the black, wiggly masses. Regretfully, since in my new mood I looked upon these crawlers as friendly enemies, I burned them. Second, I scalped away the turf in a ring somewhat smaller than the circumference of the outer branches. Third, I removed several big pailfuls of the subsoil, which my shovel showed me was, as I had feared, unnourishing basement dirt. The topsoil I saved. Then I dumped into the hole three five-gallon pailfuls of mature compost and an equal amount of good garden loam, which was well-mixed with the topsoil. Fourth, I covered up everything with two mulches, the lower one of grass clippings, the upper one of stones.

Nothing happened for the remainder of last summer. The tree continued to stand still. But no more insects annoyed it. Luck? On the contrary, I felt that organic science accounted for the tree's immunization.

When the autumn winds sent the leaves spinning down to earth again, our plum got a generous leaf mulch on top of the grass. More stones were added in restoring the rock mulch. The tree now had been put to bed for its long winter sleep.

Instead of waiting eagerly for spring to arrive so I could check on the tree's response to organic treatment, I forgot all about it due to other interests and absentmindedness. It wasn't until mid-May that I remembered I was an experimentalist and that there was a plum tree for me to notice critically. One day I happened to be going by the tree when suddenly I found it to be a compelling object and had to give it my full attention. Its leaves were cheerier than they had ever been and it was loaded with blossoms, which was remarkable as it had not been especially floriferous in former springs. Moreover, it had done some growing; quite a bit of it, in fact. It even seemed – perhaps this was a trick of the imagination – that the thinner branches had subtly reshaped themselves, exchanging their former stiff angularity for smooth-flowing lines full of gracefulness. Certainly organics had effected a transformation; a dozen times a day my wife and I had to stop by it to gloat, or peek at it through a window proudly. (We had hoped that photography would reproduce the beauty of our rehabilitated tree, but the snapshots turned out as disappointing as an apple or grapefruit bought at the chain store.) In short, the way this tree stirred us last spring would have inspired a more articulate person with the raptures which, when put into words, are called poetry.

Compost and mulching plum tree.

Running into this same species of ornamental plum on the front lawns of several of our townspeople, I have been comparing notes. In nearly every case the other tree is dwarfish and nondescript. One in particular is sadly undersized for so thick a trunk. Three or four of its main branches are missing; ugly stubs indicate where they once were. Now that is downright sad. presumably all these trees are of good nursery stock; they probably have the blood of champions in them and yet have never had a chance to realize their splendid potentialities.

Why not? What has held these trees back? What has made them unglamorous when they could have been dramatic successes?

This is a question of more than casual importance. Because it isn't just a matter of prettyfying a fellows front lawn. If under our methods of tillage our ornamental plants don't thrive, our food plants won't either. Both classes of plants require the same general conditions of cultivation.

What, then, is wrong with modern gardening and farming? It seems to me that the trouble has been that modern man has over-confidence in himself and under-confidence in nature. Banking on the fact that his scientific researches have given him such amazing discoveries as penicillin and sulfa drugs; noticing that farm mechanization and chemicalization have increased productivity spectacularly; he has a contempt for the slowpoke world of Mother Nature. He wants to play a fast game in accordance with his own rules.

The plum tree restored to health.

He may get away with that for a time but only for a time. After all, he can't raise his crops in chemical laboratories; he must raise them out in the fields where Mother Earth is boss. Sooner or later he will have to give his plants a fair deal. Crop failures, dust bowl storms, diseases of food plants and farm animals, diseases of man himself will wise him up. Mother Nature already is at work humbling modern man. Eventually she will conquer his pride, which is all-important, for it is his pride which causes most of the trouble. Pride shows man how smart he is and blinds him to his stupidity. When his food-supply is seriously threatened he will have to realize that while all his chemical witch-doctoring of unhealthy, bug-eaten plants is clever superficially, it was stupid of him to let his crops become diseased and insect-ravaged in the first place.

That such conclusions are sound I know because I have been able to study with my own two eyes, in my own front yard, what is happening on an infinitely larger scale on the farms of America. I see now what my mistakes were. I see how fatal it can be to try to improve upon nature in the sophisticated spirit of the commercial farmers. My plum tree flourished for a few years because of the vigor which nature had put into it in the first place, and because its roots were feeding in black, river-bottom dirt that had been trucked into our grounds when a lawn was first laid out here. The tree stopped prospering because of human interferences. As it got bigger its roots went deeper — into that impossible subsoil. Unable to find food to nourish an enlarged edition of itself, the tree stood still. For six years! Finally, having used up all the nourishment the soil had to offer, it went into a decline.

Nature would have come to the rescue if given a chance; automatically, a thick mulch of leaves and dead grasses and weeds and broken branches and other organic litter would have been deposited about the base of the tree, which earthworms and other soil organisms would have converted into plant food. But such slovenly housekeeping did not measure up to my citified standards; I and my kind are always tidying up the premises and throwing leaves and other humus materials into a bonfire.

Eventually insects came to censor my simple-minded husbandry. Imagining myself to be too clever to be outsmarted by mere insects, I was all for loading up my sprayer or dustgun with the poisons brainy chemists had concocted.

Luckily, this was at a time when I had ceased letting myself be indoctrinated with the guileful propaganda of the chemical interests; lately I had turned to advisers whose wisdom was deeper than the brilliant lore of chemicotherapy. Men of the stamp of Sir Albert Howard were now my teachers, Howard who had had the astounding humility to forget about his superior agricultural education and go to school for five years to the peasants of India and India's pests. "I decided," wrote Sir Howard in his *Agricultural Testament*, "that I could not do better than watch the operations of these peasants, and acquire their traditional knowledge as rapidly as possible. Another group of instructors were obviously the insects and fungi themselves." He goes on to say, "the pests must be looked upon as Nature's professors of agriculture: as an integral portion of any rational system of farming."

I could understand that now. Organic principles now illuminated for me what otherwise would have been left wholly in darkness. Insects have valuable information to impart to us; insects are an indispensable diagnostic tool for the plant grower; insects tell the knowing gardener of degenerative processes taking place inside his plants long before they are manifested externally.

I had only to drive around and notice how certain neighbors had tackled advanced stages of my problem to be morally certain about the fate of our plum tree had I relied on the usual factory remedies. That butchered-up plum tree on the other side of town told me all I needed to know. There was a tree that had been protected from insect injury with potent dusts and sprays. It had been stimulated into new growth with strong chemicals. Whereupon the tree had made supreme demands upon an infertile soil for more sustenance. But an exhausted soil cannot possibly give what it doesn't have. And so one army of caterpillars after another moved in and started chewing up the leaves of the wretched plum tree. After a year or two of insect defoliation — never complete because of chemistry's counterattack — the tree had begun to die. Then that clever improver upon nature, Mr. "Jones", had gone to work on it with his pruning saw. But the more he improved upon nature with his chemical fertilizers and insecticides, the more dead wood he had to saw off. In a few more years the tragicomedy will be finished; Mr. "Jones" by then will have used up a lot of slick chemicals ony to find that his tree is determined to die anyway.

If only the head and hand of man were not so proud. The cultivator humble enough to admit that Mother Nature is a lot smarter than he is would never have to grapple with so tearful an insect problem. For one thing, he would recognize that Dame Nature would never allow insects to live unless they were her co-workers. Knowing that, he would despise all insect remedies furnished by the chemists and chemical gadgeteers. Revitalizing his plants organically, he would find that such invigorated plants grow beautifully and repel bugs amazingly. Every growing season he would be thrilled anew at the fine possibilities of organiculture.

BACK YARD ORCHARDS THAT BEAR FRUIT

Properly chosen varieties insure good yields.

By WILLIAM ACKERMAN

FRUIT tree culture is not an occupation limited to the large-scale orchardist. Tree fruits such as apple, pear, peach, cherry, plum, etc., can be grown with considerable success on small back yard plots if certain precautions are observed. Perhaps the most serious mistake and the one made most often by the small back yard orchardist is incompatibility between fruits and improper pollination.

In many cases where the space is small and the would-be orchardist desires to have as many kinds of fruit as possible, single trees of individual fruits are planted with no thought as to whether they will be properly pollinated and thus bear fruit. It is a sad experience when an individual buys the best trees from the nursery, prepares the soil with organic materials, carefully plants the trees and tenderly cares for them year after year, only to find out that although he has beautiful trees which blossom each spring, few, if any fruits develop. Then the question arises: "Why don't my fruit trees bear fruit?" There are several factors which cause unfruitfulness among fruit trees. Several of them arise from a lack or unbalance of nutritional elements needed by the tree for fruit-formation. However, the most common factor in small backyard orchards is improper pollination.

Just what do we mean by improper pollination? To explain this, it is necessary to start with some of the fundamental facts that influence fruit-formation. When fruit trees reach a certain age, depending on the variety and the nutritional status of the tree, flowers are formed. These flowers consist of two principle parts: the pollen-producers, *i.e.*, stamens and anthers, or the male part of the flower, and the pollen-receivers, i.e., pistil and stigma, or the female part of the flower. Pollination refers to the transfer of pollen from the anthers to the stigma of a flower. Self-pollination refers to the transfer of pollen from the anthers of a flower to the stigma of the same flower or a flower of the same variety. Cross-pollination refers to the transfer of pollen from a flower on one fruit type to the stigma of a flower of a different variety. Pollination does not mean that fruit will be produced, since the pollen of many fruit trees will not fertilize the flowers of the same variety or those of some other varieties. Self-unfruitfulness, in the strict sense, means the inability of a tree to produce fruit with viable seeds following self-pollination, while self-fruitfulness involves the production of fruits with viable seeds. Cross-unfruitfulness takes place if one fruit type, when used as the pollinizer of another, is unable to produce sufficient fruits for the production of a commercial crop. If fruits are produced readily through cross-pollination, the varieties are said to be cross-fruitful. Most of the fruit types display rather definite patterns of self- and cross-unfruitfulness among the different varieties.

Some fruit trees are sufficiently self-fruitful to be dependably productive if planted alone. However, there are many other fruit varieties that will not produce fruits if planted alone, nor will they bear if planted with some other varieties. It is therefore extremely important that the proper varieties are planted which will be either self- or cross-fruitful. When cross-fruitful types are planted, it is important that they be planted close enough to insure adequate transfer of pollen by bees and other insects. Orchard observations and experimental results indicate that to obtain the most dependable set of fruit, trees of different varieties should not be further apart than about 70 to 80 feet for apple, 40 to 60 feet for pear, 40 feet for peach, 30 to 40 feet for plum and sour cherry, and 40 to 50 feet for sweet cherry.

The value of a pollinizer, other than the ability of its pollen to fertilize other flowers depends on several factors. Certain trees are not cross-fruitful because their blooming seasons usually do not overlap sufficiently. Certain two-variety combinations may be unfruitful because of the difference in age at which they form their first flowers. Also, combinations that consist of annual and decidedly alternate bearing trees will not produce full crops year after year. The use of a third variety in such cases to supplement pollination of the annual bearing tree will remedy the situation. The most frequent reason for failure of cross-pollination

between varieties is their close relationship. The unfruitful combinations in most instances are comprised of a fruit tree and its bud mutation or "bud sport."

Here are some facts about different fruits that should be considered before planting.

APPLE — Pollination tests have shown that cross-pollination is essential for a full commercial crop. It is now generally conceded that all apple varieties should be interplanted to insure the production of high yields.

A few fruits such as Jonathan, Baldwin, Rome Beauty, Gallia Beauty, and Yellow Newtown, will produce a partial crop when self-pollinated, but Baldwin is the only variety of any commercial importance which has been reported to produce a commercial crop under these circumstances.

Varieties which have proved to be ineffective as pollinizers in cross-pollination are: Arkansas Black, Baldwin, Blenheim, Canada Reinette, Crimson Bramley, Fall Pippin, Gravenstein, Red Gravenstein, Mann, Minkler, Paragon, Rhode Island Greening, Ribston Pippin, Roxbury Russet, Stark, Stayman Winesap, Staymared, Blaxtayman, Summer Rambo, Tompkins King, Turley, Hibernal, Virginia Crab and Winesap.

There are many apples which are cross-unfruitful with related varieties, mutations, or "bud sports." A few examples are:

Cortland and Early McIntosh
Rome Beauty and Gallia Beauty
Delicious and all its color strains such as Starking, Richared and Shotwell Delicious
Jonathan, Jonared and Blackjon
Northern Spy and Red Spy

At least one case has been observed of the failure of a variety that normally produces good pollen, to fertilize the flowers of a distinctly unrelated variety. Such a case is that of Grimes Golden which will not pollinate Arkansas Black or Paragon.

Proper pollination insures good fruit set, in apple.

Improper pollination results in poor set of fruit, in apple.

PEARS — All of the European pears and those of hybrid origin such as Keiffer, have been found to be completely or partially self-unfruitful. Because of this condition, a single tree or variety of pear should never be planted. Several varietal combinations have been found by various investigators to be cross-unfruitful, probably because of close relationship. In most, if not all instances, these pears are related to Bartlett. Any combination of the following varieties will produce either a very poor, or no set of fruit: Bartlett, Seckel, Louise Bonne de Jersey, and Belle Lucrative.

QUINCE — All quince varieties grown in United States have been found to be self-fruitful. These include Orange, Rea, Champion, and Meach.

PEACH — The greater proportion of tested varieties are self-fruitful and may be planted singly or in blocks of one variety. The self-unfruitful types are: Candoka, Chili, Chinese Cling, Hal-berta, Hope Farm, J. H. Hale, Mikado, Pacemaker, Sargents, Tuscan Cling, and Vimy.

NECTARINES AND APRICOTS — All varieties of these fruits have been found to be self-fruitful.

SWEET CHERRY — All sweet cherries tested have been found to be self-unfruitful. Practically no fruits at all are obtained through self-pollination. Not only does self-unfruitfulness exist, but many varietal combinations are unfruitful.

More than a dozen groups are known which contain varieties reciprocally incompatible, and the number is being enlarged with further research. The fruits within any one group are all closely related, being either seedlings or bud mutations of some parent variety. A few such groups are as follows:

1) Napoleon, Bing, Lambert, Emperor Francis and Ohio Beauty
2) Early Purple and Rockport
3) Windsor and Abundance
4) Elton, Wood and Stark's Gold
5) Black Tartarian, Knight's Early Black, Early Rivers, Bedford Prolific and Black Eagle

SOUR CHERRY — Self-fruitfulness exists for such sour cherries as Early Richmond, Montmorency, Dyehouse and the Morello group. The varieties Chase, Homer, and Ostheim have been found to produce only a small set when self-pollinated and should be interplanted with other sour cherries. All sour cherries (with the possible exception of Wragg and Ostheim) produce sufficient viable pollen in abundance.

DUKE CHERRY — Duke cherries are the result of crosses between the sweet and sour cherries. They are, thus, hybrids which range in taste between sweet and sour, actually

being neither. All Duke varieties have been found to produce full commercial crops only when cross-pollinated. Of the Dukes, the Royal Duke and May Duke are usually the most productive, with Reine Hortense producing somewhat lighter yields.

The late-blooming sweet cherries, such as Napoleon, Windsor and Wood are effective in cross-pollinating the earlier blooming Dukes. On the other hand, the early to midseason blooming sour cherries such as Montmorency and Early Richmond, are sufficiently effective pollinizers for the late-blooming Dukes.

PLUM — The group is represented by three distinctly separate groups: the European, Japanese, and Native American plum. The European plum exhibits a rather wide range of differences in the response of its varieties to set fruit through self- and cross pollination. Among plums that have been classified, differences of unfruitfulness have been claimed in different parts of the world. This has been explained by the fact that different strains of supposedly the same variety are grown in different regions. Under such circumstances, it would be difficult to list those that are self-fruitful, since, as an example, the results in California contradict those in New York, those in Washington, and so forth.

Pollination tests have shown that the greater proportion of varieties included in the Japanese group are self-unfruitful. The varieties, Beauty, Climax, Methley, and Santa Rosa, produce more fruits from self-pollination than the other Japanese plums, but it is recommended that even these be interplanted with other effectively pollinizing Japanese plums. In addition, this group is subject to a considerable amount of pollen sterility. The pollen of Apex, Apple, Combination, Eldorado, Formosa, Gaviota, and Kelsey is so low in viability that they are not recommended as pollinizers of any other plums.

Some varieties of the European plum will pollinize the Japanese types but not all are consistently effective in this role. Recently, it has been reported that Clyman, Ouillins, Reine Claude, Victoria and Yellow Egg give fair to good sets on Japanese varieties. Those native American species which possess viable pollen have been found to be the most effective pollinizers of the Japanese plums.

NATIVE AMERICAN SPECIES AND HYBRIDS — The following varieties are self-unfruitful.

Prunus americana—DeSota, Hawkeye, Rollingstone, and Wyant

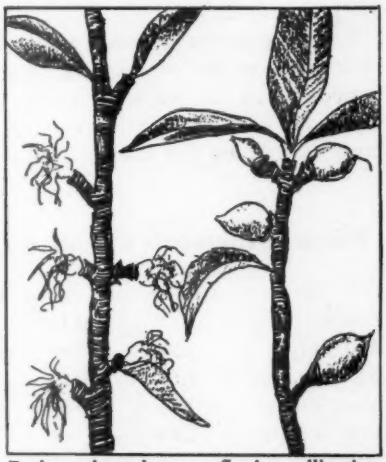
Var. *Mollis*—Wolfe

Prunus hortulana—Wayland

Var. *mineri*—Miner, Surprise

Prunus munsoniana—Wild Goose, Newman

Prunus nigra—Cheney



Fruit set depends upon effective pollination.
Left — ineffective pollination.
Right — effective pollination.

A number of varieties which originated as hybrids of these species and the Japanese plum are not only self-unfruitful but also are ineffective as pollinizers. Among these are Red Wing, Monitor, Underwood, Elliott, La Crescent, Tonka, Radisson, and Fiebing. Surprise is reported to be the best single pollinizing variety for all the hybrids grown in the Mississippi Valley.

Suggested Planting for Fruit Trees

Where cross-pollination is necessary and there is not room for more than one tree, trees may be top-worked to more than one variety. This is a grafting or budding procedure that involves the placement of two or more varieties on one tree. Many nurseries sell two-in-one, or three-in-one trees which contain selected varieties which are cross-fruitful in respect to each other. Information on how to top-work your trees may be obtained from your State Agricultural Experiment Station or the United States Department of Agriculture.

If more than one tree of a particular fruit is necessary and there is not room for the standard trees, it is possible to buy dwarf trees which may be planted much closer together. Many growers have had considerable success with dwarf trees. They do, however, sometimes develop compatibility difficulties between root and top systems that result in poor growth and fruit production. If you have room for standard trees, they are the best.

Since this article is directed primarily toward the small backyard orchardist, the minimum number of trees of each fruit that may safely be planted will be discussed. If you have room and wish to plant more trees of a given fruit, the planting may be expanded.

Apple — A minimum of two cross-fruitful trees for all varieties except Baldwin, which may be planted alone.

Pear — A minimum of two cross-fruitful trees for all varieties with no exceptions. The Bartlett pear has been claimed to set a partial crop of fruit through self-pollination in some regions (primarily California), but it is not sufficient to be considered a recommendable practice to plant Bartlett alone. The Kieffer pear also sets a partial crop at times.

Quince — A single tree of one variety may be planted.

Peach — A single tree of one variety may be planted except for those

(Continued on page 57)

MINERAL CONSTITUENTS OF LEAVES

Leaves of trees are rich in plant nutrients and humus.

By PROF. M. B. CUMMINGS

THE interested reader may desire more detailed information on the mineral constituents of leaves; also something on the relative values of the different leaf species. Fortunately the importance of leaves in the forest floor has prompted studies which are of much general interest and value to gardeners. Chemical determinations have been made which give the desired information.

Five elements are present in leaves, namely calcium, magnesium, potassium, phosphorus and nitrogen; and then the ash content has been determined for twenty-four species of tree leaves (by Lutz and Chandler, whose tabular data in a book on Forest Soils is given below). The nutrient elements were ascertained from freshly fallen leaves from common forest trees. The values in the figures below the elements listed are expressed as percentages of dry weight, an important point to note in studying the tabled data.

The nutrient materials shown in the table above are all relatively small in percentages as listed with the exception of the ash content, and the amounts for the different species vary widely, as the figure's reveal. This is to be expected. Large amounts are not needed, but large quantities of crude fiber for organic material are necessary.

The amount of calcium, more commonly known as lime, is different for each species. It varies from a minimum of 0.55% for loblolly pine to a maximum of 3.84% for basswood. With most species it is more than 1% but less than 3%. Lime is a corrective for soil acidity and it enters into plant growth construction as an essential constituent. All plants need lime.

The magnesium column in the table displays the per cent of this ingredient in the different species of leaves. The amount is small in every case, being less than 1%, and ranges from 0.14% for hemlock to 0.77% for basswood. While the amount is small, it is, nevertheless, indispensable in balanced and normal growth of plants. It occurs very sparingly in many soils and is in some wholly absent, in which case it results in malnutrition.

Potassium in dry leaves is displayed in column three. The amount is very small, being less than one per cent in all cases save one, namely

Nutrient Elements in Fallen Leaves — 24 Common Species

Name	Calcium	Magnesium	Potassium	Phosphorus	Nitrogen	Ash
Balsam fir	1.12	0.16	0.12	0.09	1.25	3.08
Red Maple	1.29	0.40	0.40	0.09	0.52	10.97
Sugar maple	1.81	0.24	0.75	0.11	0.67	11.85
Black birch	1.65	0.28	0.75	0.17	0.72	—
Shag hickory	2.09	—	1.18	0.16	0.91	9.59
Bitter nut hickory	3.41	0.55	0.44	0.12	0.67	—
American beech	0.99	0.22	0.65	0.10	0.67	7.37
White ash	2.37	0.27	0.54	0.15	0.63	10.26
Tulip tree	2.56	0.45	0.95	0.11	0.51	10.67
Magnolia	1.71	0.29	0.76	0.28	0.58	—
Norway spruce	1.96	0.23	0.39	0.09	1.02	—
Red pine	0.79	0.20	0.35	0.10	0.89	—
Jack pine	0.61	—	0.16	0.04	0.58	4.15
Sh't. L'v. pine	0.75	—	—	—	1.00	3.50
Norway pine	0.76	0.18	0.30	0.07	0.68	4.27
Eur. White pine	0.72	0.19	0.19	0.07	0.70	4.33
Loblolly pine	0.55	—	—	—	0.80	3.01
Quaking aspen	2.11	0.23	0.47	0.10	0.73	—
Black cherry	2.37	0.42	0.55	0.18	0.60	—
White oak	1.36	0.24	0.52	0.13	0.65	5.71
N. red oak	1.38	0.25	0.65	0.11	0.64	6.84
White cedar	2.16	0.15	0.25	0.04	0.60	—
Basswood	3.84	0.77	0.52	0.12	1.01	15.16
E. hemlock	0.68	0.14	0.27	0.07	1.05	—

Nature mulches liberally with leaves and leafmold.

the shagbark hickory where it equalled 1.18%, but it was as low as 0.12% in the case of balsam fir. Potassium is needed in plant growth, giving stiffness and toughness to tissues. Many soils are deficient in potash, hence any supply from leaves is helpful.

Phosphorus occurs in small quantities in dry leaves and in leaf mold. The smallest amount of 0.04% was found in white cedar, also in Jack pine, and the most of all in magnolia leaves. Phosphorus in some form is needed in flower and seed production and elsewhere in the plant body.

Nitrogen, the last of the five elements, is shown in column five. The most, 1.25% was found in balsam fir, and the least, 0.51%, was found in the tulip tree leaves. Nitrogen is needed in relatively large quantities for plant tissue construction. It is a leachy element because so readily soluble as nitrate. It is rather expensive to buy, hence conservation is a wise practice.

The ash content of dry leaves looms large compared to the separate ingredients as given in the table. The amount of it varies widely in the different species, being as low as 3.01% in loblolly pine and as high as 15.16% in basswood.

All in all, it is seen that although the plant needs are small for many mineral ingredients, the amount occurring in dry leaves is not in some cases insignificant. It is helpful to replenish natural supplies in the soil and is second in significance only to the organic matter contained in leaves, which is exceedingly important.

MEMORIAL TO SIR ALBERT HOWARD

THE above bronze bas-relief of Sir Albert Howard, size 12 by 16 inches, was recently carved by Angelo W. Frudakis, the distinguished sculptor who has lately been honored by being awarded the Prix de Rome for 1950 and also a Guggenheim Fellowship. The bronze is now mounted in the offices of ORGANIC GARDENING and will be an abundant source of inspiration to us. Its presence there suggests that Sir Albert is still with us, looking over our shoulders to guide, counsel, and approve of our continuing efforts. Although his name will best be perpetuated through his own immortal work, we do him this additional honor in recognizing him as the author and founder of organiculture.

The sculptor, on his way to Italy, visited with Lady Louise Howard in London, who graciously equipped him for his assignment by giving him several photographs of her husband as well as a vivid description of his personality and character.

It is a superb piece of work. Anyone interested in purchasing a bronze replica can do so by contacting the artist at: Box 73, Saxtons River, Vermont.

LEAVINGS

How to collect and use autumnal leaves.

By ALDEN STAHR

WHEN leaves begin to fall it's time for action, to persuade others to refrain from destroying this natural plant food and to gather as many leaves as time and energy will allow. We found that by having a definite plan of action we could accomplish more in this direction than by dabbling at it.

First, we decided to let our own leaves enrich our own trees, so we let them lay where they fall. In a surprisingly short time the wind and rain break them up and wet them down so you can scarcely find them.

Since so many people burn their leaves anyway, we get all our leaves from outside our own property from people who ordinarily destroy them. And we found it more efficient to get them all from one source than to scurry around from place to place. It's easy enough to find a large estate where the owner is glad to get rid of the leaves without the nuisance and danger of burning them and he or his caretaker will usually rake them for you as they would have to be raked up to burn in any case.

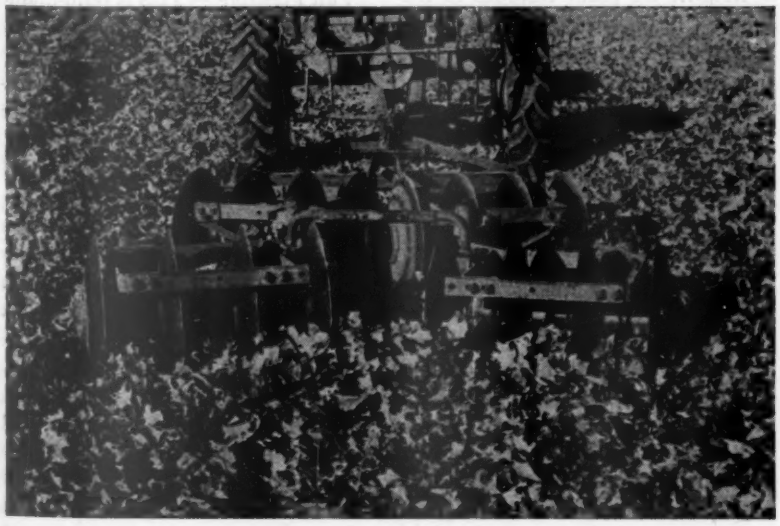
We found it both back-breaking and time-consuming to try to hold burlap bags open by hand and to fill them at the same time, so we made a wooden frame which holds two bags at a time This frame has a row of finishing nails along the top so that bags of differing sizes may be fastened to them. With this device we were able to average a bag a minute

Loading two bags at a time.

With the seats out of the station wagon we were able to load in thirty-six bags at a time And we found that we could load many more leaves in tightly-packed bags than by loading them in the car in bulk.

We tried shredding the first load, but it took two hours, so this idea was abandoned as too time-consuming even with a tractor-operated grinder. After that we dumped and spread the leaves directly on the garden and ran a disc over them several times. This broke up most of the leaves and worked them into the soil where they decay during the winter We put two hundred bags on one garden about 75 ft. by 100 ft., another hundred bags were used as a deep mulch on strawberry and asparagus beds and two hundred bags were dumped in a bin to be used for mulching next spring.

The whole purpose of this little routine was to obtain and utilize as many leaves as possible with the least possible expenditure of time and effort. We got five hundred bags in five hundred minutes, much less time than it would have taken to burn them, and ended up with a great mass of good plant food instead of a mess of ashes and smoke in our eyes.



Discing leaves in the garden.

OCTOBER GARDEN CALENDAR

By WILLIAM H. EYSTER, Ph. D.

OCTOBER, for plants, is a season of fulfillment. Flowers have been converted into fruits containing mature seeds, twigs have hardened, buds are protected by their covering of scales and often sealed with wax or insulated with hairs, while most of the herbaceous plants have already withdrawn to underground quarters for the winter season. Every plant has its method of successfully spending the winter. As organic gardeners, we must learn from Mother Nature how best to over-winter each of the plants we grow in our gardens. A seed is a marvelous structure as it contains an embryonic plant, a sufficient food supply to nourish the embryo into a seedling, a protective covering, and often some adaptation for transporting the seed to new locations which may be distant from the parent plant. Buds on trees include entire branches which will unfold when spring arrives. Some buds have the flowers already formed ready for unfolding when conditions favorable to them return. While some plants spend the winter in the seed stage, others withdraw to such underground structures as bulbs, corms, rhizomes, and fleshy roots.

Help Nature with her winter care of your plants by cleaning away all dead plant material to the compost heap, and then by covering your soil with suitable mulch, especially in parts of the country where snow does not blanket the earth during the winter. Garden equipment should be cleaned, oiled, and stored in a dry place. Be careful to gather and store plant stakes so that they will be available for use again the following season.

Complete the gathering of seeds from your late-flowering annuals and perennials. Store them in properly labeled envelopes. Seeds from plants grown in soils rich in organic matter and minerals are better by far than any you can purchase from even the best seed houses.

Nature celebrates the end of the growing season in a festival of leaves. The brilliant and varied colors in the leaves of woody plants in autumn constitute a fitting finale for the season. What beauty in the leaves! The colors fade, and the leaves fall to the earth to protect and enrich it. To burn them is a crime against the earth.

The North

Preparation of the Soil for Winter. — Remove all plant residues to the compost heap, level off the soil, and feed the soil organisms by working into the surface layers of the soil plant and animal residues which will be converted into compost by spring. It is desirable also to cover the surface of the soil with a weedseed-free mulch. This will enable you to prepare the soil earlier in the spring. Or sow winter rye which will provide additional organic matter to be worked into the soil in the spring.

Fall Planting. Shrubs, trees, and hardy perennials may still be planted in all but the northernmost States. Bulbs of tulips and lilies should be planted this month.

Preparation of Plants for Winter. Rhododendrons and azaleas should be mulched with leaves. In the northern states Hybrid Tea Roses should be hilled up with soil 12 to 15 inches deep before the ground freezes. After the ground has frozen, cover the roses with hay, evergreen boughs, or other plant materials that will not pack too closely. Climbing roses should be laid on the ground and covered with from 3 to 6 inches of soil and a little mulch over the soil. Pot and move inside any plants that you want for your winter garden. Give the evergreens a good soaking with water. Store your root crops for the winter table and the roots and bulbs of flowering plants in a cool, dry place; preferably in dry sand. Bulbs or roots of spring-blooming plants may still be put into the soil.

The West Coast

Fall Planting — This is bulb-planting time west of the Rockies. Exercise great care in the selection of bulbs for planting. Make flat-bottomed holes so that the entire base of the bulbs is in contact with soil. Bulbs which appear to be dry should be soaked in water a few hours before planting. Care must be taken that the stem end of the bulb is oriented upward. I mention this because I know of more than one person who planted their bulbs upside down with unsatisfactory results. If gophers are a pest in your region, the roots of oriental poppies as well as the roots and bulbs of other plants should be protected by the use of wire screen baskets. Anemone and ranunculus roots should be soaked

in water until they are plump before planting.

The South

The Lawn — If you have not already done so, you should plant your evergreen lawn without delay so that it may be well established before freezing weather. For best results use Italian rye grass mixed with some Dutch white clover. This seed mixture may be sown in a Bermuda grass lawn which has become brown, but the dead Bermuda grass should be raked off first and the ground given a good application of finely sieved compost to be worked into the soil with the seed mixture. By following these directions you will have a beautifully green lawn during the winter and spring months.

The Flower Garden — This is the best month for planting spring-blooming bulbs, corms, and roots. For best results with pansies, use northern-grown seedlings. If planted this month they will bloom profusely in January. Delphiniums, which behave as annuals in Florida, should be planted this month. Poinsettias should be staked to prevent them from wind damage. Give the dahlias a liberal application of compost to insure the best possible burst of bloom in November.

The Vegetable Garden — All cool-season vegetables may be planted this month. To give them a good push before cool weather, put an inch of compost in the bottom of the seed furrow and sow the seed along side the compost. Hotbeds and cold frames should be made ready for use next month.

Inter-Mountain *

In the Inter-Mountain region the most critical job is to harvest any late vegetables (or flowers) before Jack Frost gets 'em. If the weather has permitted tomatoes to ripen this late, they'd better be taken indoors soon. They'll ripen fast in windows, slow if wrapped in paper and kept in the basement. Remember that squashes and pumpkins want dry, warm storage whereas carrots, parsnips and cabbages do better in a cool, dark room. Hang up onions in string-knotted sacks; ventilation is important.

October is to some extent seed-time as well as harvest-time. Not only do bulbs go in now, but we can sow the seeds of the hardier flowers now, imitating nature.

The vegetable garden will need final attention this month. Sanitation calls for pulling up yellow asparagus stalks, cornstalks, and so on. Also gather up any unusable vegetables such as rotting tomatoes. Better tidy up the lawn, too. All this organic debris goes into that catchall, the compost-pile. Start it in the garden this year so it can benefit from the leaching of nutrients. See that your fruit trees contribute their windfalls to it; you will eliminate breeding places of pests and diseases, speed up the breakdown of compostible materials, and enrich the pile, all at the same time.

In your cleanup of the grounds, be nice to those wonderful insect-controllers, the toads and birds. Give the toads a chance to bury themselves for winter hibernation; provide food and water for the birds when snowstorms and freeze-ups prevail.

Mulch your bushes and vines such as roses and grapes. Bring all house plants indoors; first give them a good drink of compost water or liquid manure as a starter. For friends who can appreciate organic plants, put some of your choice seeds in suitable, labeled containers; they'll make acceptable Christmas gifts. Put some of the shapelier gourds and pumpkins aside for Hallowe'en and Thanksgiving house-decorating. If your bleeding hearts, irises or other perennials haven't been blooming too well they may need root division. If you have set out a lot of new plants this fall, accurate ground maps are imperative; labels come off or become badly blurred.

Save yourself as much of next spring's work as possible by doing it now when you are less rushed and the weather is more dependable; get going on any vegetable or flower beds that need enlarging or re-locating; distribute compost where needed; inspect your garden equipment, sharpening and oiling tools, repairing and painting the coldframe, fixing that wobbly wheel on the handcart.

The Lower South **

The Flower Garden — Beginning October, set out rose bushes until the end of March. With proper care these favorite flowers can be enjoyed all summer long as well as during most of the other months of the year. Cuttings from rose bushes can now be started from those already in the garden. Other flowers to be planted this month are ageratum, alyssum, African daisy, aster, baby's breath, balsam, blue lace flower, bachelor's button, calendula, calliopsis, candytuft, carnation, Chinese forget-me-not, Shasta daisy, dianthus, blanket flower, strawflower, hollyhock, lupine, nasturtium, pansy, petunia, phlox, California poppy, Queen Anne's lace, salvia, scabiosa, snapdragon, statice, sweet peas, periwinkle.

Fruit and Vegetable Garden — Following the September planting, another and heavy planting should be made of peas (English peas as the Florida gardeners call them to distinguish them from the South's favorite cow peas). In an article published in the *Florida Grower* some time ago, Entomologist Tissot, of the Florida Experiment Station, noted that "The pea aphid is found in Florida wherever English peas are grown causing damage amounting to millions of dollars." An interesting description of the insects' life and habits follows, with suggested treatments with dusts and sprays. For home gardeners who are using organic methods, the damage from aphids may be minimized by extra care in preparing the soil and mulching heavily. Peas like a rich humus-filled soil, but care should be taken to use only well ripened compost, as they do not use the coarse material as readily as corn and some

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**Edwin H. Abrams, St. Cloud, Florida.

other plants. A deep trench nearly filled with compost, and a mixture of soil and compost above will afford plant food to make strong and quick-growing vines. Mulching after the plants are high enough is advisable. Plant also bush beans, beet, broccoli, Brussels sprouts, cabbage, Chinese cabbage, carrot, cauliflower, celery, collard, endive, garlic, kale, kohlrabi, leek, lettuce, mustard, onion seed and sets, parsley, parsnips, pepper, potatoes, radish, rhubarb, romaine, rutabaga, spinach, Swiss chard, turnip.

The Southwest ***

Even in October you still have many busy planting days ahead; but, whatever you do be sure to make the most of the favorable garden weather while the soil is warm and stimulating from the long summer baking. Later on the night temperature drops below 50 degrees F. and the days grow shorter. Night temperatures determine our garden operations and "spring shooting to seed" can easily be prevented by watching your thermometer.

Flower Garden — First, after you have attended to the proper preparation of your soil and its irrigation, rush in your winter-blooming annuals. If you have not raised your own you will find your local nurseries well stocked with many excellent plants. Set calendulas, Iceland poppies, the superior tetra-snapdragons, stocks, pansies and violas. Early planting of *Primula malacoides* and *P. obconica* will give before-Christmas bloom. Deep rooting annuals such as centaureas, scarlet flax, field poppies, larkspurs and other deep-rooting annuals can be broadcasted where they are to bloom. For a colorful winter carpet bed try the golden African daisies.

October is the main bulb-planting month for Southern California and Arizona. As the soil is much warmer and dryer, plant deeper than instructed in Eastern catalogs. Narcissus in variety can be planted for the first succession. South Africans and native bulbs can be rushed in the first of the month. The new Dutch iris and Spanish Blue Bells, *Scilla campanulata* should be in every home garden. Get the California raised Tecolote ranunculus and anemones. Do not soak in water but place between damp cloths or paper towels. Start in plant bands to prevent destruction by snails, slugs and birds. Be sure to refrigerate your tulip bulbs as soon as you get them and do not plant them until November, for early planting results in short stems, poor foliage and inferior blooms. Enrich your soil with flour bone meal and compost. Do not use animal manures. Ground covers contribute much beauty to your bulbs. Use color contrasts. Broadcast sweet alyssum, baby-blue-eyes (*Nemophila insignis*), Virginia stocks, creamcups, Douglas daisies, linaria and nemesia. Set in plants of Blue Bird forget-me-nots, pansies and violas immediately after setting the bulbs. Most perennials grow too vigorously to make good ground covers. Plant them a little back or in the background for better effects. The newer lilies of the vigorous hybrids grown in the Pacific Northwest do best in western gardens. Many are available this fall. Try the Bellingham and centifolium Olympic hybrids and a host of others. *Lilium Henryi, L. regale, L. pardalinum* will stand anything in the way of garden hardships. Try the new Sunset Lily and Dr. Griffith's Shuksan.

Perennials of all sorts should be set out so as to make strong fall and winter growths at the spring blooming period. Delphinium Pacific hybrids, coral bells, columbines, pentstemons, *Bergenia crassifolia*, Scotch pinks, gaillardias, geums, Shasta daisies, rudbeckias, and rehmannias are among the best. Such biennials as foxgloves, hollyhocks, sweet williams, and canterbury bells benefit by early planting. October is one of the best months to plant new lawns and renovate old ones. Special rakes are available for this work with matted Bermuda. By sowing clover immediately you can have a green lawn both spring and summer. Dichondra is one of the most popular lawn substitutes, and we should make more use of our sandstrawberry. Grow a crop or two of weeds and turn under before sowing your lawn seed. Mulch with well rotted compost or Georgia peat.

Vegetable Gardening — Cover crops should be planted on all unused garden plots. *Melilotus indica* and oats mixed with purple vetch are excellent. Windsor beans furnish lots of humus and large nitrogen nodules. Practice sheet composting whenever possible. Continue planting well-grown plants of winter vegetables such as cabbage, cauliflower, kale, kohlrabi, Italian sprouting broccoli, celery, seedling onions, romaine, and leaf and head lettuce. Chinese ediblepods and telephone peas as well as Windsor beans can be planted the last of the month. Set chives and parsley in the herb garden. Sow in well-watered double rows seeds of beets, carrots, onions, Cos lettuce, leaf lettuce, white turnips, yellow turnips, Southern curled and Chinese mustard, Chinese radish and French breakfast radishes. Mulch thinly and top sprinkle if hot winds come or an unexpected hot spell. Soaking carrots and beets hastens germination. Use radish as a nurse crop for carrots.

Trees and Shrubs — Hardy evergreens both conifers and broad leaved ones may be planted at this time. Use more natives. October is an ideal time for planting our native trees, shrubs and perennials. They are water savers in this dry land and are both frost and heat resistant. Avoid planting tropicals and semi-tropicals unless you are in a "frostless" belt. Do not get too much water on tender material so that the frost takes them in December and January. Be sure that your deciduous things, both fruit and flowering trees, are not neglected. Fall drought is a destroyer, and drying out at this period means less fruit or fewer blossoms for the coming season.

***Charlotte M. Hoak, 1125 Stratford Ave., So. Pasadena, California.

MISCELLANY

By J. I. RODALE

Dangers of 2, 4-D

EVIDENCE is piling up against using 2,4-D as a weed killer. I stopped to converse with a farmer the other day who tried to tell me what a nice crop of rye he raised without the use of chemical fertilizers. It came about this way: He applied 2,4-D to a crop of sweet corn in order to curb the weeds, and it actually killed his crop of sweet corn. So he plowed it down and planted rye. The crop was so big and was of such good quality that he is selling the rye seed to other farmers to be used as seed for planting their rye crops.

Elm Tree Injury

The July 29, *Chicago Tribune* carries the following item:

Just how several of the elm trees on one of the farm lawns could have been injured by the weed killing chemical 2,4-D remains somewhat of a mystery, but apparently the weed killer was the cause.

The company in charge of the farm's tree care program has diagnosed it as 2,4-D injury. The stunted and curled leaves, discolored along the edges and cupped at the ends, appear to have been sprayed directly with the chemical. This, however, was not the case.

Last summer the lawn beneath the trees was sprayed with 2,4-D, chiefly to rid it of white clover and a few dandelions. It was the first time in three years the lawn had been sprayed. The odd thing about it is that although the spraying took place last August, the injury to the trees was not observed until the trees leafed out this spring.

Parathion

Just after I finished writing that root vegetables are affected relatively little by insecticides, I came across an unhappy experiment in the *Journal of Economic Entomology* (June, 1950). Parathion-sprayed potatoes are not safe from large concentrations of the poison. When potatoes are grown in soil containing twenty-five pounds of parathion per acre, dangerous amounts of the toxicant become stored in the plants, including the tubers. Although parathion may not be found on the surface of potato tubers, its roots can absorb plenty of it to send through the whole plant.

Poisons in Bread

The U. S. Industrial Chemicals, Inc. has worked out a way to get after the insects that destroy 10 per cent of the grain crops in the United States. Fumigants kill the grain-eating insects that are already in the grain, but the problem is, how to stop the depredations of crops of insects that come after the fumigation. The U. S. Industrial Chemicals, Inc. has put on the market an insecticide dust which is applied at the time of original storage and which holds fast to each individual grain. Under experiments it has been found that one treatment protects the grain for an entire season.

The question is, "What poison is contained in this dust and does it saturate itself into the grain?" When one eats a loaf of bread made from such grain does one ingest some of that poison. On the organic farm we have found little trouble with such insects in the storage of our grain. With the American mechanical and scientific ingenuity we should be able to work out safer techniques for combating the insect in storage, but the wrong people are working on the problem. When a chemical company devotes itself to such a task, naturally it will use chemicals as its solution to the problem. Why not encourage engineering firms to tackle the problem? In the last analysis it is possible that if no solution is found it would be better to let the insect destroy 10 per cent of the grain, because the 90 per cent that remains will be worth much to a health-conscious public than the 100 per cent that it tainted with some kind of dangerous poison. But a way can be found.

Organic Professions

A reader writes in to ask for advice as to what work he can enter to help the cause of organiculture. He says that he is graduating from high school this year and may enter college this fall. This is what I wrote him:

Replying to your letter asking what work you could go into, I would like to recommend being a nutritionist. If you could write to various universities and find out what the work would include, and what it would mean after graduation as far as positions are concerned, this would be helpful. Being a nutritionist in a hospital would enable you to disclose to physicians the value of organically produced food.

Another suggestion would be, possibly, the running of a restaurant with organically produced food. Perhaps you could study restaurant management, and then try to sell someone with capital on the idea.

Another suggestion would be if you could run an agency that gets subscriptions for lots of different magazines, and then make sure that you get a lot of subscriptions to *Organic Gardening, The Organic Farmer,* and *Prevention.*

The most obvious thing that I could recommend would be to study agriculture, as it might lead to something more important in a field that could help the organic cause.

War and the Organic Method

As war is being waged in Korea one comes to a realization of how important it is for us to have a strong manhood to protect our country. One hears talk of Russia invading through Alaska and pouring millions of men onto our continent.

Who knows? We should be thoroughly prepared for such an eventuality. The army should realize that it should study for itself what kind of agriculture will give our young men not only the strongest bodies but the best functioning minds—minds that can resist the vigors of war—minds that will not break down under the slightest unusual stress. There is much evidence that the use of chemical fertilizers is under suspicion in regard to producing food of optimum quality to build healthy bodies. Congress has recently passed a resolution to investigate the use of chemical fertilizers. The National Grange in November, 1949 passed a similar resolution stating that there has been so much talk that the organic method produces health in individuals that consume foods grown organically that it is high time it is investigated thoroughly.

The army is concerned with flood control for the reason that it effects the operation of the army in this country. If it investigates chemical fertilizers from the human health angle it will find that the use of more organic matter will reduce the amount and extent of floods in this country. It is something extremely important to building the strong armies of the future. Anyone who grows food organically for sale to others to that extent is greatly patriotic. And from the same point of view, I say without the slightest attempt at exaggeration, that he who uses chemical fertilizers in growing foods for sale is not patriotic. I repeat again. He is absolutely and definitely NOT patriotic.

Readers would do well to clip this item or have it typewritten and send it in to the War Department, to the Navy Department, to the Department of State, to the President, to congressmen, senators and to any other public officials that they may know of. We must not permit the prejudiced chemical fertilizer companies to sell our heritage for a mess of potage. It has gotten to the point where agriculture cannot be permitted to be controlled by professors who are concerned only about the status quo, who think that the use of chemical fertilizers will give higher yields when this is not so, who object to common-sense suggestions because they emanate from unacademic sources. The welfare of our nation is at stake.

An organic novel

A novel has recently been written, called *The Old Oaken Bucket* by Bellamy Partridge and published by Thomas Y. Crowell that should be of interest to all organiculturists. One of the characters in the story raises earthworms and delivers a glorious address to a garden club in which he mentions many of the benefits of the organic method of farming and gardening to man and to civilization. It is a mighty effective bit of advertising for the organic method and shows what progress it is making. Of late I would say that such progress is in geometric rather than in arithmetic ratio. It really amazes me.

Fried Eggs in New York

The other day I had some fried eggs in the great city of New York. I was startled at their lack of taste. Under ordinary conditions I probably would never have noticed it but since I wrote my series on cancer and convinced myself that salt should be used most sparingly, I have of late not put any salt on my eggs. With our own eggs laid by hens that are fed food raised organically on our own farm, I did not miss the salt too much, for the eggs had a most delicious taste, but with these New York eggs, without any salt to disguise their insipidity, was like tasting paper. In other words with the average salted egg one tastes the salt and precious little of the egg.

White Garden

Many years ago the famous columnist, O. O. McIntyre said in his column, that the one thing he would love to do some time was to have a garden with flowers that were all white. I do not know whether he was ever able to satisfy this craving. It was my wife who read it, not I. When she reminisced about it the other day we decided to do it. For the year (1951), we will grow it in the stone garden, which is to the left of our house at the road, and we will call it the O. O. McIntyre White Garden in memory of one of the finest men that ever lived, a man who loved flowers, animals and people. We are open for suggestions from our readers in connection with the growing of white annuals.

Fur Goodness Sake

Now I have done it. Or I should have said that I should not have done it. I really should maintain my dignity and here I have gone and made a pun as the title of this item. And they say that punning is the lowest form of humor. But I just could not help myself. I could say it was almost a trap to make me lose my dignity. Here is the item received from one of our readers which is causing all the trouble. The X lady said: "It might give you a chuckle to know that I put a couple of old fur pieces in my compost pile last winter. Doesn't that take the cake?" I would say that it does. I am glad that this lady sent in this item because it gives me an opportunity to say that under certain conditions it is necessary to make compost, especially with garbage and with fur pieces. Otherwise the fashion is becoming to mulch.

Japanese Enzactivator

In the December, 1949 *Organic Gardening* I wrote an article about a patent that I had found in the U. S. Patent office, taken out by a Japanese, on an enzyme preparation made from fermented grains and I termed the Japanese product enzactivator. Its prime purpose was for use as a deodorant and to tie in nitrogen in decomposing compost matter. We decided to give it a trial as a fertilizer. In the spring of 1950 in a 2½-acre field of oats we applied the enzactivator in a liberal quantity to half the crop. The yields from both parts of the field were about alike. In fact that part without the en-

zactivator outyielded it by about three per cent. We had another poor experience with it in our hothouse last winter. Since it is still raw organic matter, although it is somewhat fermented, if it is desired for use as a fertilizer it should be applied months before the crop is planted so that it can decay sufficiently.

Caution Regarding D-D-T

There has come to my attention a case of a child who was petting a dog that was sprayed with D-D-T, and who contracted a bronchial ailment as a result. There seems to be evidence of bronchial complications resulting from the fumes of D-D-T. Extreme care must be exercised in the home and its environs in connection with this poisonous preparation.

11th Commandment

Here is a passage from a book called *Soil Fertility and Sewage*, by J. P. J. Van vuren, published by Faber and Faber, London, which is worth while reproducing:

If, according to Lowdermilk, Moses had known what would be the ultimate fate of his beloved country, and the rest of the civilized world, at the time when he wrote the Ten Commandments on Mount Nebo, he would undoubtedly have included an Eleventh Commandment, which might most probably have read as follows:

"Thou shalt inherit the Holy Earth as a faithful steward, conserving its resources and productivity from generation to generation. Thou shalt safeguard thy fields from soil erosion, thy living waters from drying up, thy forests from desolation, and protect thy hills from over-grazing by the herds, that thy descendants may have abundance for ever. If any shall fail in this stewardship of the land thy fruitful fields shall become sterile, stony ground or wasting gullies, and thy descendants shall decrease and live in poverty or perish off the face of the earth."

Danger from Nitrate Fertilizers

In the April, 1949 issue of *Organic*

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Gardening appeared an extremely significant article entitled "Nitrates attacked by Soil Scientist," which was summarized as follows:

"Leafy vegetables, frozen foods, and prepared baby foods were analyzed for their content of nitrate. From the findings it is suggested that the nitrate in such foods may contribute to hemoglobinemia found in infants and may produce certain toxic, if not lethal, conditions in adults. The high content of nitrate in the foods may be attributed in many instances to the application of nitrogenous fertilizers, especially nitrate of soda, to growing crops."

In the July 23, 1950 issue of the *Atlanta Journal* and the *Atlanta Constitution*, on the first page, appears a news item that throws additional light on the dangers resulting in different ways from the use of nitrate chemical fertilizers. Here is the item:

"Blue Baby" Deaths Laid to Well Water

A state health department engineer prescribed Augusta city water, and saved a "blue baby" from possible death.

The state health department reported Saturday the case of a child whose "blueness" was due not to congenital heart disease, but to the fact that his father-farmer stored fertilizer too close to the well.

A close check revealed that there had been six "blue babies" on nine farms in the immediate area, and that three of them died before reaching the age of six months. The same cause was suspected for the other cases.

The engineer's analysis of well water on the Screven county farm resulted in a finding that the baby was a victim of methemoglobinemia, an ailment not related to heart disease but which has the same effect of "cyanosing," or turning blue, those it affects.

The well water proved to have a nitrate nitrogen content of 7.5 parts in 1,000,000. All but one of the neighboring farms showed nitrogen in their water.

"Drinking water from the Augusta municipal supply was prescribed for the mother and baby and the attacks ceased," the health department said.

The department issued a warning against storing commercial fertilizer in out-buildings near the farm well, or washing out fertilizer sacks and throwing the wash water on the ground near the water supply.

It is said the evidence was conclusive in the "cured" case that nitrate nitrogen content of 3 to 10 parts of nitrate per million in the drinking water caused the cyanosis. Evidence in the other cases — checked too late — was reported "somewhat sketchy and inconclusive" but worthy of study on a statewide basis.

Note that in the headline of this item the newspaper says "Blue baby deaths laid to well water." They would have done better to have said "Blue baby deaths laid to chemical fertilizers." But there seems to be some vague fear or something that makes newspapers afraid to come out against chemical fertilizers in any way. The editor does not seem to know that such an attitude reacts against the interest of himself and his family. Do they not want to give their children the best start in life — healthy bodies and strong teeth? This question of chemical fertilizers is coming to be the number one item in our lives and our newspapers must be the ones to bring it out, not conceal it. Such an item as this should have been the subject for a rousing editorial. But the trouble in our American life with its specializations is that we depend on the specialists. We worship them. We worship the scientist, the agronomist the physician. They must do our thinking for us on their respective specialties, and they can do no wrong. Our brains become paralyzed on the simplest matters. Cannot we see certain things for ourselves? Is it not as plain as day? Yet we say to ourselves it must be all right because the agricultural scientists are not getting excited about it. If you wait for them to become excited over the use of chemical fertilizers you are

going to wait for a long time. They will do nothing about it, for it means revising all their text books and what a job that would be. They will not do anything until the consequences of their criminal delay reach the proportions of a national calamity. Then they will swallow their pride and get at the real truth, that the land must be given its due.

My Cancer Series

In a few months my entire series of 13 articles on cancer will be available in the form of a booklet which will be sold at 50c a copy. Incidentally while on this subject it is interesting to note the interest that it stirred up. It is now being reprinted in two medical journals and excerpts from them have appeared in dozens of places. Here is a far cry from it way off in Rhodesia at the other end of the world. It is contained in the following newspaper item, published in the Seattle *Times* of July 5, 1950, with a dateline, Salisbury, Rhodesia.

"Soil, Cancer Related"

Over-cropping of the soil and soil erosion are directly connected with the spread of cancer in Rhodesia, E. Guillan Hopper, of the Natural Resources Board, said in a broadcast from Salisbury. He started a heated controversy in farming circles. Hopper referred to a book published in 1937 by Dr. Frederic Hoffman, for one of the largest insurance companies, showing how the incidence of cancer is closely related to poverty of the soil and to "our puny efforts to renew its fertility by pouring on chemicals." Hopper said he knew he would be criticized and abused but would be satisfied if his contention got the wide attention of farmers — which he thought the subject deserved.

Is Hopper a reader of our magazine? We have quite a few subscribers in Rhodesia. In my cancer series I referred to the work of Dr. Hoffman from which Hopper quotes. More power to you, Dr. Hopper.

Mulching

A few weeks ago a little old man made the rounds of our gardens and when he came to the vegetable patch and saw it all covered over with a mulch, he took another look.

"What is this?" he said. "Where are the weeds?"

"There are very few weeds," I replied. "We make very little compost but take the material which we would have used to make compost with and apply it to the soil as a mulch. It pretty effectively controls the weeds, besides conserving the moisture and in decaying furnishes nutrients to the soil."

The man kept looking at it and scratching his head. Finally he said: "I don't like it. There's not enough work to it."

The Soil and Health Foundation

The Soil and Health Foundation has been organized and incorporated in the Courts of the State of Pennsylvania for the following general purposes:

(a) To promote, foster and encourage the use of humus and other organic matter in order to maintain and improve soil fertility, to prevent soil erosion, and to improve the health of man.

(b) To conduct, engage in, foster and encourage scientific research and study and teaching, training, informing and educating the public on and concerning the soil, foods and health of man—and their relation to each other.

(c) To study the effects of organic and artificial fertilizers on soil, plants, animals and man.

(d) In order to accomplish the foregoing purposes to establish, use, maintain and operate farms, schools, laboratories, experimental stations, publishing houses and all other appropiate agencies, means and instruments.

Through its publications, the Foundation will publicize the results of its investigations and endeavor to educate farmers, gardeners, and the public in general in cultural practices which will insure the better conservation of our soils and the public health.

All who make contributions to this Foundation become members, regardless of the amount given. A contribution continues the membership for a year. Will all members who have not done so, send their contributions for another year to the Secretary, Soil and Health Foundation, Emmaus, Pa.

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by J. I. RODALE

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GRAND NEWS ABOUT POTASH ROCK

Potash rock found to be a satisfactory source of potassium for crop plants.

By RUTH RODALE

RECENTLY we received an exciting piece of news from the Connecticut Agricultural Experiment Station. T. R. Swanback, at the Tobacco Laboratory (Windsor, Conn.) has finished a three year test proving that granite stone meal is an available source of potash for tobacco plants. The findings have been published in Bulletin 536, "Granite Stone Meal as a Source of Potash for Tobacco"-April, 1950. Until now, granite stone meal was hardly suspected to be economically feasible as a potash fertilizer. While thousands of granite quarries all over the United States, send out millions of tons for honoring the famous and the dead, no one was aware of its true value to the living. Another ground rock can then be added to the list of natural fertilizers that will supplement organic matter.

We are reprinting excerpts from the above mentioned booklet with more of our comments at the end of the article.

Granite Stone Meal as a Source of Potash for Tobacco

T. R. SWANBACK

In fertilization of cigar tobacco it is essential to furnish potash for "luxury consumption" in order to promote burn of the finished product. Hence, finding the most suitable potash-bearing materials is of great importance.

An "ideal" form is the potash carried in the organics, which are widely used in fertilization of Connecticut tobacco. However, the organics (*cottonseed meal, castor pomace,* etc.), are mainly used as carriers of nitrogen and only a limited quantity of potash is derived from that source.

The common sources of commercially available potash, such as sulfate, nitrate, carbonate of potash and ashes, all have limitations in their usage. Too much sulfate of potash should not be employed because of its sulfur content. This element is commonly known to affect adversely the burn of tobacco and also, in excess, may impair the grading (quality) of the finished product. Nitrate of potash is limited because of the restricted usage of nitrate nitrogen in tobacco fertilizer. The general use of carbonate of potash and ashes is unsatisfactory because of their alkaline effect on the soil.

Recently, experiments were started with a type of granite stone meal with an unusually high content of total potash, obtained from granite quarries in Massachusetts.

The potash-bearing minerals in granite are the potash feldspars and the micas, of which the latter contain the most easily released potash. From time to time attempts have been made to utilize the material in agriculture. In 1912, Hiltner working with seradella (a European fodder plant) in water cultures, observed that the plants grew vigorously in solutions to which acidic granite was added. Soderbaum reported that granite meal gave good results as a source of potash. This was attributed to the fact that the potash was largely in the form of mica.

For the purpose of investigating the value of granite stone meal as a source of potash for tobacco, a series of tests was started here in 1947. The following is a report on results from three years of research.

Preliminary Tests

The potash content, claimed to be 8 per cent, was found to be as much as 11.7 per cent potash in one sample, when the material was boiled for five minutes in a 5 per cent hydrochloric acid solution. It is rather certain that the stone meal under investigation contained at least the claimed amount of total potash. It was evident that stone meal would furnish absorbable potash by the simple action of exuded carbon dioxide from the roots.

In the fall of 1947 a section of a shade tobacco field which had a very low content of available potash received stone meal at the rate of two tons to the acre. Rye was seeded as a cover crop. The following spring when the rye was about seven inches tall, seedlings were cut off at the ground surface in four different places on the treated plot and the same procedure was followed on an

adjacent untreated section which had a satisfactory potash supply in the soil. The samples were dried, powdered, and examined for potash content. The rye from the control area contained 2.62 per cent potash, and that from the section treated with the stone meal 2.73 per cent potash. It is thus suggested that the stone meal furnished *absorbable* potash. Part of this potash, however, may not be detected by accepted soil testing methods, since it comes from a so-called non-available form.

A number of acids are formed in the soil in decaying processes as a result of the activity of microorganisms. Nitric acid is formed in the nitrification of the great quantities of organics applied annually to tobacco land.

Stone meal may be acted upon by a relatively weak solution of a strong acid, such as nitric acid produced in the nitrification processes in the soil. Furthermore, a portion of the stone meal will probably be in a colloidal suspension in the soil moisture, when it is applied to the land, and it should be rather easily attacked.

Field Experiments in 1947

A preliminary field test with granite stone meal was undertaken in 1947. The stone meal used contained 11.7 per cent potash. A great portion of the material was in the form of a fine dust.

Stone meal was applied at two rates; two tons and one ton per acre. The stone meal was to serve as the main source of potash. Sulfate of potash, applied at the rate of 335 pounds per acre, was the major source in a check treatment. This furnished 160 pounds of potash which, together with 40 pounds in cottonseed meal, provided 200 pounds of potash to the acre.

The following fertilizer ingredients were used per acre on both stone meal and sulfate of potash plots.

2000	lbs.	Cottonseed meal
200	"	Ammonium nitrate
200	"	Precipitated bone
300	"	Limestone

In addition, two control plots were included which received no commercial fertilizer or potash applications. All plots (1/80 acre each) were laid out in duplicates for each treatment.

Two tons of stone meal per acre as the main source of potash produced fully as good a grading of tobacco as that grown with sulfate of potash. The one-ton stone meal application resulted in somewhat lower grading. *(Yields are not affected by potash, unless there are great excesses in the soil, in which case there would be a decrease in yield).*

The results of this experiment direct another jibe at the "sacred cow", Science. The long-standing test of a commercial fertilizer (a substance five per cent soluble in distilled water) appears to need revising. Distilled water is by no means a replica of the soil solution, through which weak acids are known to circulate. Here is clear evidence that the mineral rock, granite, completely insoluble in distilled water, was made available to plant roots by small amounts of carbonic acid, nitric acid and perhaps others that are found in soils where organic matter is present. The results were so good that, as Swanback says, "with stone meal as one of the sources of potash in a tobacco fertilizer, the crop value was increased nearly five per cent." Then we cannot help being suspicious of soil testings that rate the mineral content of soils only by their solubility in water.

We are hoping to see in the future a greatly expanded use of the granite stone meal, as one source of needed potash. There are advertisements of it in this magazine. Both gardeners and farmers will be more than pleased with this trace element-filled ground potash rock, that is so much cheaper than chemical fertilizers. Many of the root crops and bulbs, in particular, very heavy feeders of potash, will show an amazing revitalizing under granite treatment.

• THE END •

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ORGANIC GARDENING Box 10G Emmaus, Pa.

Answer to our critics

(*Continued from page 15*)

E. Pfeiffer. Many large companies are engaging in research to compost their organic wastes. A tremendous amount of activity is going on and much of it is by-passing the agricultural experts and their universities, because they have little experience in this type of work. With all this to do about the organic method, by this time the agricultural colleges should have had years of experimental work behind them in this field. Instead they make vague unscientific statements that there is no evidence to prove such and such and this and that. The article by Professor Koon which I am answering is typical. Instead of wasting the time writing such an ill-conceived piece, he should have started a real scientific and thorough project that would check on the claims that we make.

Now, if in spite of all that I have said, some farmers do not wish to bother with the task of foraging for outside waste organic residues, they can *purchase* organic matter. There are available such things as soybean meal, cottonseed meal, tankage, castor pomace, etc., which can be used in moderation because of their high price, although soybean meal is not too expensive considering the amount of nitrogen it carries. We are beginning to use some of it at the rate of about 200 pounds per acre. Bone meal can also be purchased and used in moderation. The use of plant crops grown on other farms, or your own, does not mean robbing one acre to fertilize another because as I have previously explained, more than 90 per cent of the content of a plant comes from the air and not from the soil.

Eventually the Government will have to take a strong hand to see that every farmer adds enough organic matter to his soil. When it becomes generally known that there is a definite connection between the use of organic matter in the soil and human health and the general public begins to howl about it, the powers that be in agriculture will begin to watch the organic matter in the soil as the medical profession husbands blood banks used for transfusions. Today the Government furnishes to the farmer such fertilizer items as superphosphate, lime, etc. at extremely low prices. The time must come when the Government will have to enter into the picture as far as organic matter is concerned, because of the rapid depletion of our soils, and the eventual production of foods that will be so devoid of nutritional elements that there will be large scale epidemics of degenerative diseases which will become far worse than they are today. Some day the Government will build up large organizations in each county to see to it that every bit of residual and waste organic matter is preserved and given to farmers as part of a farm program similar to what is in operation today. This cost will actually be saved monetarily, by less need for the Government to spend money for hospitals, dams to hold back floods, caused by soils hardened by chemical fertilizers and other soil erosion preventative projects, etc., besides giving higher yields.

We have learned that the employment of thousands of foresters is helping to save our forests, which is such an important contribution to the fertility of our soils. The situation and our attitude towards the wastage of organic matter may be compared to a forest fire which is raging, with no one concerned about quenching it. People like Professor Koon are fiddling while Rome is burning. Let me cite a typical example. At Galveston, Texas, there is always some seaweed drifting in to shore, but recently some vast growth of it must have broken loose and it is lying many feet deep along the beaches so that it is disturbing the resort people. No one has found a way to get rid of it yet. But there are processes by which such material could be made available for land use. It is ironic that so much soil from the erosion of our lands finds its way into the sea, that it would be logical to find some way of getting it back, and seaweed is a ready-made method for the accomplishment of this exchange. Who knows but if the Government were to make a study of the amount of seaweed available in the oceans there would be a huge amount available for agriculture. This would be one of the finest subsidies that a Government could bestow upon its farmers, for seaweed is rich in the valuable trace mineral elements that our crops seem to lack. When Professor Koon says that there is not enough organic matter to go around he is right. There is not enough if the farmer is to try to get a supply based on the present organization of its supply, with the garbage incinerators of our big cities burning up huge amounts every day, with sewage being dumped out at sea, with no regard being given to what will no doubt be referred to later by a more intelligent generation as the greatest crime of the Twentieth Century.

This is what I mean: The Government will no doubt have to regulate the chemurgic use of organic farm residues. By chemurgy is meant the use of crops for other than food uses. For example, making industrial alcohol from corn, using farm crops to make synthetic tires, and making wall-board out of sugar cane wastes, are examples of the application of chemurgy. The need for this organic matter to be returned to the soil is more urgent than the industrial use for it will add to the vitamins in the public's food. I do not hear Professor Koon raise his voice in condemnation of such practices. Instead of that, the Agricultural Experiment Stations are aiding and abetting the industrial interests who are exploiting our farmlands and are actually experimenting to find other ways so that what is supposed to be

used for food production may be perverted to other uses. The agricultural leaders are becoming pretty calloused about such things. Witness a statement by Wheeler McMillan, editor of *The Farm Journal,* in the *Chemurgic Digest* of June, 1950. He said:

"Chemurgy has been criticized by misinformed persons who think that if crop residues find profitable chemurgic markets, soils will be deprived of organic matter now returned to them. It would be a blessing if every scrap of stalk, straw or other residue could be sold. What is left in the fields is usually insufficient to maintain the organic content at high level, yet the fact that it has been plowed under deceives farmers into thinking that they are doing enough. If all the residues were sold, the need and the income for real soil-building practices would become visible. Farmers would hunt out and grow the deep-rooting strong-growing kinds of soiling crops that put organic matter into the soil in quantity, and put some of it down into the depths where plows do not reach."

This is the type of thinking that says the organic method is not practical because there is not enough organic matter to go around. Therefore they take millions of tons of organic matter off the farms each year with a clear conscience, with a criminal disregard for the well-being of those farms. And Wheeler McMillan in the very same article just referred to says, "And so little is scientifically established about the relationships between soil character and health that theoretical cults endanger the receptivity for facts that should be forthcoming." Those who have read the evidence produced in the last issue, about the effect of the organic method on the health of plants, animal and man, will be the judges of the above criticism and its prejudiced bias. It is rather ironical that this very same Wheeler McMillan who I have been told is a wonderful man, made the statement in his publication, *The Farm Journal,* that in spite of the use of chemical fertilizers the average farm yields today are not higher than in the time of the 'eighties when chemical fertilizers were not used. But I can safely tell Mr. McMillan that if all the organic matter that has been employed in chemurgic use had been applied to the soil instead, there would have been higher yields. This is based on the experience of thousands of organiculturists.

I do not know whether I have answered Professor Koon satisfactorily on the point whether or not there is sufficient organic matter to go around. Theoretically it can be approached in this manner:

The farmer harvests his wheat and let us say, he sells his product, the seed, to a mill for use in baking bread. The public eats the bread. Part of it helps to build his body. The rest is voided by him and goes

into the sewer. On the farm there are three elements to be considered — the roots of the crop which decay to furnish valuable organic matter, the stubble of the stems of the wheat which will be plowed under and thirdly, the rest of the stem referred to as the straw. If we were to return the human waste portion and the straw to the soil we would accomplish a 100 per cent return of organic matter to the land. In most cases the straw does find its way back, if not on one farm then on another. In the case of wheat, the only weak point is in that portion that inevitably goes down the sewer. There is a growing consciousness of the importance of conserving every ounce of these human organic wastes, and movements are on foot all over the country not only to turn sewage into sludge, but to transform that sludge into compost. Eventually every municipality will know the value to the land of these wastes and all of it will find its way back to the soil. The question is how does all this serve as an answer to Professor Koon?

We must go back again to the concept that the plant gets far less than 10 per cent of its nourishment from the soil. The remainder comes from the air. If every portion of the wheat plant, except that little that remains as building blocks in the human body, is returned to the soil, then it will be getting back a bonus of at least 70 per cent more than was taken from it. The secret then is to carefully pursue all organic wastes that go off the farm and see that they are returned. Then we can be sure that there will be sufficient green matter to go around.

Take the case of a crop of corn. The only item that we need to worry about is the cob. All over this intelligent country you can see huge piles of cobs being burned after the kernels are removed. All we need to do is to see that they are ground up fine and brought back to the land. Then there would be more than enough organic material to go around. Instead of such a program what do we find? We see the agricultural experiment stations breaking their necks to find ways to make wall board and other chemurgic products out of corn cobs.

Let us take the case of a typical vegetable crop — carrots. The weak point there is in the green tops, which the grocer cuts off and sends to the city incinerator to be consigned to the flames. Occasionally some farmer will use such vegetable residues to feed his pigs. There seems to be much interest and experimental work going on to compost all city garbage which would include all such green grocer's wastes, but it will no doubt take 50 years or more to be accomplished. But that will plug a big gap in the losses of organic matter from our farms.

I believe I have answered Professor Koon on the question as to whether there is sufficient organic matter to go around. I can add one more salvo, however, before I lay down my pen. There is available much organic matter from sources that do not originate from our farmlands and are thus an extra safety factor,

(*Continued on page* 60)

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Lionel James Picton

(*Continued from page 27*)

prominently in a press campaign and in a deputation to the Ministry of Food an attempt to gain official recognition of the importance of using the whole wheat and especially of retaining the germ, for it is in the oily part of the germ that the fertility vitamin resides—Vitamin E, deficiency of which is a far commoner cause of sterility in women than is generally understood. The importance which Picton attached to this question is amply endorsed by the fact that in his *Thoughts on Feeding* he devoted no less than five chapters to the subject of bread, in addition to one on flour.

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The extent of his knowledge, his wide and varied reading, his deeply reflective mind, his vitality of expression in the written word, his concern for the present health and future stability of the human race emerge from the pages of his book to the eye of the discerning reader. To meet and speak with him is to encounter a character all too rare in the world of today—the cultured and courteous English gentleman.

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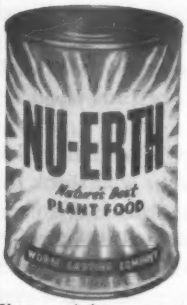

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Back yard orchards that bear fruit

(*Continued from page* 39)

fruits previously listed as being self-unfruitful. If one of this group of peach trees is planted, another variety must be planted also.

Nectarine and Apricot — A single tree of one variety of either of these two fruits may be planted.

Sweet Cherry — A minimum of two cross-fruitful varieties must be planted. For fruit-production it is necessary to have at least one tree of two or more different groups listed previously under sweet cherry.

Sour Cherry — A single tree for those varieties previously listed as self-fruitful. At least two trees of different types for those self-unfruitful.

Duke Cherry — A minimum of two cross-fruitful varieties unless a single Duke cherry tree is pollinated with a late-blooming sweet or early-blooming sour cherry, as previously discussed.

Plum — The minimum number of trees required will depend on whether the particular trees desired are self-fruitful or not. Where self-unfruitful types are concerned, it will be well to investigate in the particular nursery catalogue you use, or from the nurseryman himself, whether the varieties you desire, sold by him, are known to be cross-fruitful.

This article does not cover all of the varieties of the different fruits sold by nurserymen in this country. Such a listing would be voluminous and more involved than the average reader would care for. The article covers most of the more popularly known varieties, but if you are in doubt about the fruitfulness of your trees, consult the catalogue or your nurseryman. When one considers the great disappointment which will result in years to come from an initial mistake in selecting varieties, it is a good policy to take a little extra trouble and be sure.

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HINTS for the FLOWER GARDEN

Lily Bulbs

Unpack lily bulbs as soon as they arrive, and waste no time in getting them into the ground. Drying them in the open air is detrimental to the bulbs. Handle them with care and it is advised that a little sand be used under and around most lily bulbs when they are planted to lessen rot diseases.

Proper Depth for Bulbs

Many amateur gardeners complain that their spring flowering bulbs do not come up and bloom. On several instances after investigation of their bulbs and how they were planted it is a wonder that some of them ever got through the ground. In most of the cases the trouble was the depth to which the bulbs were planted.

Tulips, hyacinth and narcissus need to be planted to a depth of six and one-half inches. This means that the top end of the bulb should set six and one-half inches below the soil surface. Grape hyacinth and scilla should be planted four inches deep. Snowdrop and crocus need only three inches of soil over the top of the growing tip.

Many gardeners have the idea that when a bulb is set at a given depth, that the depth is taken from the bottom of the bulb. This is wrong. The depth should be measured from the top of the bulb to the soil surface.

Chrysanthemums

Clumps of chrysanthemums in flower may be dug and potted for house decoration or they may be moved to some other part of the garden for fall color effects.

House Plants

Take in the house plants promptly. Pot them in good compost and keep them on a porch or other protected place where they may gradually become accustomed to house conditions.

Gladiolus

Gladiolus bulbs should be allowed to cure in shallow flats for two or three weeks. They can be stored in a cool place, but above freezing.

Winter Geranium

If you like winter-flowering geranium, take some cuttings out and root them in sand, and when rooted, place in three-inch pots.

Flower Containers

Various shaped gourds can be made into extremely attractive flower containers. When the seeds are removed and the gourds are brightly painted, they're excellent for holding those old battered cans that every flower lover seems to accumulate.

Preserving Flowers

There are many ways to preserve plants, flowers, and grasses in the condition in which they grow naturally. Dipping in paraffin, brushing with transparent varnish or lacquer, or by dipping in melted beeswax. Also, flowers may be dried out in fine, dry sand, or with unslaked lime and plaster of paris. There are some plants which can be dipped in a solution of salicylic acid to obtain the preservation effect.

By following these processes, it is not hard for an amateur to do a very fine job which will last a long time.

Propagating Potatoes

Seed balls from potatoes may be left on the plant until they mature or until they are threatened by hard frosts. After gathering they are dried in a moderately warm room. The seeds are then removed by crushing the balls into a pulp, and dropping them in a jar of water in a warm room to ferment. After several days, they are dried at room temperature and in the spring planted in the same manner as tomato seedlings early in the season.

Yellow Tomato Resists Wilt

Here's good news to gardeners who like to grow yellow tomatoes. A wilt-resistant version of the variety, Jubilee, has been produced by the Department of Agriculture. Jubilee, the most prominent of all yellow tomatoes has had one serious drawback — susceptibility to wilt. Now the Agricultural Department has crossed it with another tomato, Pan American, to produce the new variety, Sunray, which has all the good qualities of Jubilee, plus wilt resistance. Seed of Sunray will be available to the gardener in 1951.

Increase in Carotene

According to Capper Farmer, quoting U.S.D.A. experiments at their field station in Cheyenne, Wyoming, the carotene content of carrots increases in storage. During a storage period of 30 weeks in a moist root cellar, the carotene content increased from 89 to over 115 milligrams per 100 grams of dry matter.

Ant Control

Where ants are a problem, constant cultivation will prevent the formation of ant hills for they will have no chance to form a colony.

Endive Through the Winter

If you have endive in your garden, transplant from the outside rows so that you have a compact bed with close rows. Pick off all the old outside leaves which have been bruised and which look like they might decay soon. For the first few frosts in the fall, cover the endive with sacks. Then on a *clear, dry* day, build three sides out of posts or planks just high enough to clear the plants, leaving a hole on the south side for air and so the endive may be picked. For a roof, place some substantial posts or planks from one side to the other. Fill in the spaces with boards and top with opened corrugated paper cartons. Then mound the soil from all sides so that water has a chance to drain from the endive bed inside. The entrance is closed with boards and paper cartons, to be opened only when the outside temperature is above freezing and when endive is picked. If properly done, endive will keep until February or March.

Late Tomatoes

If some of your tomatoes are still green they can be picked just before frost and let ripen inside. Tomatoes ripened off the vine won't have the same quality and flavor as vine-ripened fruit, but they will be well worth saving. Place some in a warm sunny place inside so that they will ripen rapidly; others may be placed in darker, cooler places so that the ripening process will be delayed. In this way, some fruit will be saved for later use.

They'll Keep Better

Squashes and pumpkins should be picked before frost and stored in a warm place with good air circulation. In this way, you will have firm vegetables, free of cold injury and rot.

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Answer to our critics

(*Continued from page 55*)

outside of the formula I have given above. One such important item could be seaweed and other sea products. Another is leaves from our forests. It not only would not harm them to take a portion of these leaves each year, but if not overdone it would actually help the forest because it is possible that too rich a food supply causes too many trees to grow and tends to create overcrowding and disease. The farmer must get away from his high-hat attitude that it is beneath his dignity to lower himself to haul leaves and other organic wastes. His salvation depends on curing himself of such an attitude. Another source of outside organic matter is peat. There are millions of tons of it available. Then there is marsh hay and mud at the bottoms of lakes and rivers. I am getting six large truckloads of moss taken from a drinking water reservoir of a nearby city. These are all outside of our farmlands.

In conclusion let me quote from a letter dated June 19, 1950, received from Dr. Howard W. Higbee, Associate Professor of Soil Technology, of Pennsylvania State College, School of Agriculture. His final words were: "Our sewer systems are the biggest robbers of land fertility. The American people insist on dumping the fertility of the land into our streams so it will flow out into the ocean where it is gone forever. This is "food for thought." This should be food for thoughtless scientists who are inextricably caught in the chemical web, who refuse to look to the right or to the left of them, who follow a single track of thinking, who refuse to experiment with an idea because it comes from persons who they think are crack-pots. If they do not soon begin to investigate the matter discussed in this article, they will have upon their collective consciences a terrible crime toward their fellowmen. If Professor Koon will inspect the advertising pages of the *Organic Farmer* magazine he will find the advertisement of a company, a large concern, that is offering for sale a complete organic and mineral fertilizer. Industry is going over the heads of the agricultural college professors who are telling them that it cannot be done.

Professor Koon, what is more important, the loss of your dignity by the admission of error, which seems to be the one thing that a scientist will not stoop to, or the well-being of billions of people whose lives and health you are holding in your hand?

(*To be continued*)

Mulched Gardens on The Organic Farm

(*Continued from page 23*)

particles. Finely shredded mulch is more apt to be moist and less inviting to mice and other animals which usually live in loose plant materials.

As the mulch is digested and converted into compost by soil organisms, additional mulching material must be added to the ring around each fruit tree. The ring can be extended as the tree increases in size.

Materials used for mulching the fruit trees on the Organic Farm include corn cobs, shredded bark, shredded hay, spent hops and shredded leaves.

The grape vines over the arbor on the lawn of the farm house have been mulched with stones, compost, and pulverized rocks; while those in the small vineyard adjacent to the garden are mulched with leaf mold and leaves. During the past three years, these vines have been unusually vigorous, free from diseases and pests, and fruitful.

Small fruits, including blueberry, raspberry, and strawberry, have been mulched with sawdust, leaf mold, and various kinds of finely shredded plant materials. The mulching has proved entirely satisfactory. The health and fruitfulness of the different kinds of small fruits included in the garden indicate that mulching creates especially favorable conditions.

Diseased Plant Material

Q. What shall I do with diseased plant material? Can I use it as a mulch?

A. No. We do not suggest that you use it that way. This is one case where composting is advisable with the family garbage which also should not be used in mulching. The best way to compost garbage and diseased material is by applying earthworms to the mass. Try to keep the heap not over two feet high and do not permit too much rain to get into it in rainy seasons or much of the nutrients will wash out from below unless there is a cement bottom.

Questions on New Organic Method

Q. In the application of the new organic method, would it not be advisable to apply high nitrogen materials (legumes, etc.) to leafy vegetables and materials high in potash and phosphates to flowering and fruiting plants? I understand that high nitrogen induces vegetation growth and the other materials induce flower and fruit production.

A. That is one value of the new organic method. In the old method of making compost one kind of compost was made for all plants, but that was not bad because the compost was more or less in a neutral condition. With the new method, however, you can furnish in the mulches a more specific plant food, furnishing acidity where acidity is needed, nitrogen where nitrogen is needed, etc.

Q. In the new organic method of sheet composting there is supposedly perfect aeration. Does this mean that there are appreciable amounts of nitrogen lost, or is it more of a "cold" fermentation without loss of nitrogen?

A. Just the opposite. It has been shown by Professor Dhar's researches over a period of many years in India that thin layers of organic matter placed on the surface soil result in increased nitrogen, by means of fixation of this element from the air. Such organic mulches probably increase the azotobacter bacteria which have the power of fixing nitrogen from the air. The mulches do decay by a cold fermentation.

Q. If soil bacteria give off large amounts of carbon dioxide, would not this compound be of extreme value to plants, since it is used by them in the process of photosynthesis? Would this not be one explanation of why plants growing in soils high in organic matter and microorganisms flourish so well?

A. This is true. Decaying organic matter also gives off carbon dioxide and since this compound is heavier than air it hugs the ground and is thus more easily used by the plants. It no doubt is lethal to some insects which may be the reason why we have noticed less insect infestation this, our first year with the mulching method in our vegetable garden.

Q. Since earthworms play an important part in mixing the organic materials of the compost heap, would they not also be valuable if incorporated in the sheet composting technique in the garden?

A. Yes. They can be used to great advantage in the garden under mulches provided the mulching principle is adhered to as a regular thing. The earthworms will stay where there is organic matter for them to work on, and they will help to decay the mulch which is what we want. They will thus enrich the soil with their castings which are better even than animal manure.

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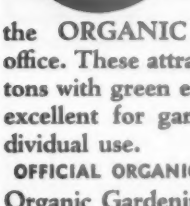

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THE BIRCHES — GHENT — NEW YORK Open since June 1st. Accommodations limited to adults. Weekly rates $40.00 up. Seasonal vegetables, fruits and berries organically grown on premises. All other available organic foods used in kitchen.

If you wish to buy or sell organically-grown foods send advertising copy to Organic Gardening, 48 S. West Street, Allentown, Pa. The purpose of the Trading Post is to bring together the buyer and seller of organically-grown food products. Rates are 2½¢ a word. (1½¢ a word for 3 or more months using same copy). Minimum 25 words, or $5.25. Payable in advance. Include name and address in word count.

ORGANIC TRADING POST

WALNUT ACRES NEW WHEAT CROP HARVESTED—new strawberry jam and honey. Home-grown, organically raised, stone-ground wheat, rye, corn, buckwheat flours, cereals. PAUL KEENE, Penns Creek, Penna.

ORGANICALLY GROWN WHEAT processed into 100% whole wheat and cereal containing all the original vitamins and mineral salts of the wheat berry. Trial 5 lb. bags of flour or cereal sent postpaid for $1.00. LOU-HELEN RANCH, Davison, Michigan.

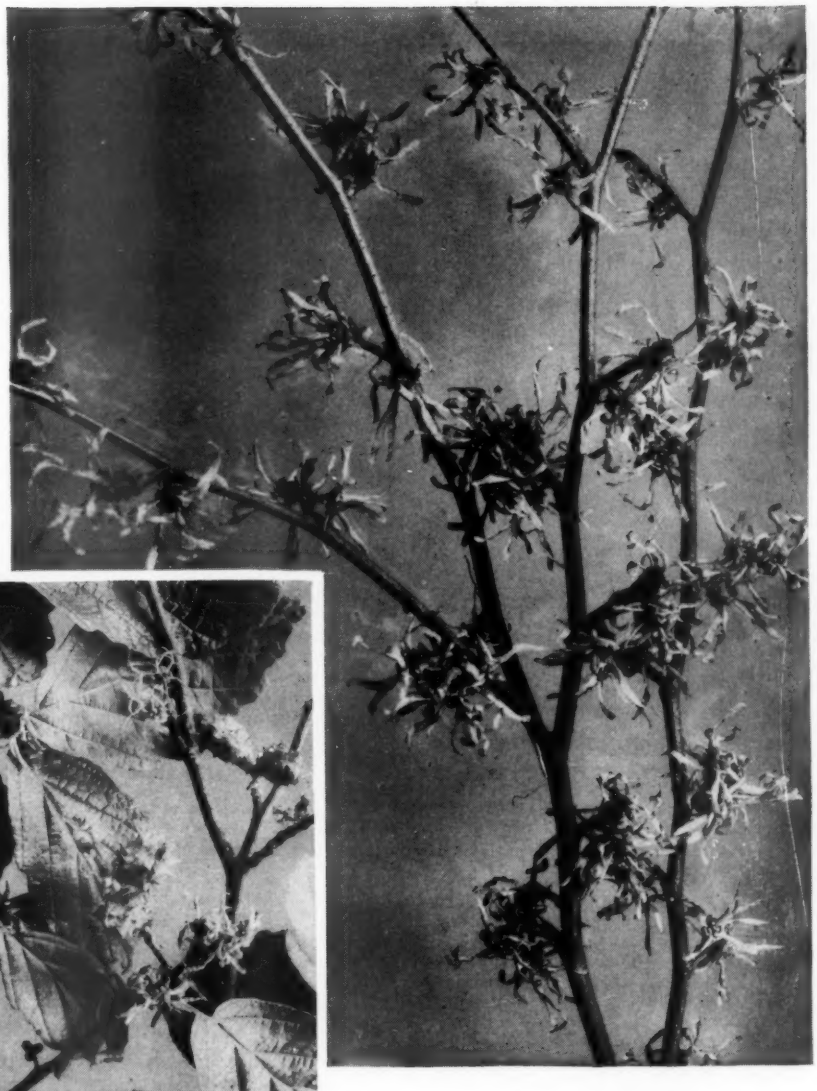
TREE RIPENED and TREE COLORED assorted varieties and sizes oranges, ORGANICALLY GROWN, $4.00 per bushel f.o.b. Shipping season may open early November. CARTWRIGHT GROVES, Carrizo Springs, Texas.

TREE RIPENED STUART PECANS, picked up, not powershaken, processed or poisoned, treerun, all natural vitamins retained. 10 to 100 lb. lots, 35¢ pound. F.O.B. Barwick. Shipping begins Oct. 15. Order early, avoid disappointment, limited supply. Recipes for Customers—They're TOPS. CLIP and File this ad—It will not appear again. CALDWELL, Barwick, Georgia. Near World's Pecan Capital.

SHIPPING NOW! Why buy inferior vegetables when we can supply premium produce at fair prices. GERICKE'S ORGANIC FARM, 2876 Arthur Kill Road, Staten Island 9, New York.

ORGANICALLY GROWN POTATOES, free from poisonous sprays and chemical fertilizers. $4.00 bushel collect. F.O.B. NICK SCHORR, 536 South Argyle, Phillips, Wisconsin.

Native Shrubs
for
Ornamental Plantings



COMMON WITCH-HAZEL

(Hamamelis virginiana)

THIS native American shrub, common in damp woods of nearly half the United States, is the last northern shrub to bear flowers in the fall. Because of this, its straight-veined, showy leaves, and bright-yellow, strap-shaped flower petals, it is valued as an ornamental plant. It is recommended for shady places, but in full sun grows into a splendid well-rounded specimen.

In growing the witch-hazel it is best to avoid birches on the home grounds. When planted near birch trees, a peculiar insect makes small cones on the under surface of the witch-hazel leaves. These cone-shaped insect galls do not seriously hurt the plants, but they can be avoided by not growing birch trees.

Witch-hazel blooms in the autumn about the time leaves are falling. It is common along brooks, and can be recognized by its yellow flowers on the defoliated plants. The bony seeds do not mature until the following summer. The fruits burst elastically to expel the seeds.

What is SHEET Composting?

To make a "sheet" or "soil" compost you merely spread your waste directly upon garden or field and let it decompose slowly thru the action of ActivO and earthworms — instead of piling it up in a heap or putting it in a cabinet and reducing it first; viz:

You mix ActivO (and a little limestone to neutralize) with the waste; spread it between the plant rows or over the harvested garden or field; disc, hoe or roto-till a little to mix *slightly* with soil (but do *not* till deeply) ... and the job is done. ActivO and soil life do the rest. It remains as a semi-mulch until you dig it deeper later on.

Advantages: Somewhat less effort, perhaps, than cabinet composting; quite a little less laborious than heap composting; and builds up garden or field earthworm population. *Disadvantages*: Decomposition takes much longer; *and* unless your soil already has high fertility or you add additional nutrients, the "grow-power" of your soil will be reduced the first season. This is because organisms that decompose waste temporarily grab the soil nutrients for "power and energy" until the job is done. If you use ActivO there should be no odor from putrefactive materials or burn from raw manures.

BEST BET FOR FARMERS is to sheet-compost over a cover or green manure crop, discing-in the ActivO-treated waste and green crop enough to mix a bit of field soil with it — then to disc again before planting.

FOR GARDENS we prefer this: Place the ActivO-treated waste into a narrow trench between the rows — continually, all season. As you proceed, cover this, and all space between the rows, with a mulch (leaves, straw, grass, etc.) Thus you avoid cultivating and keep down weeds. But best use some extra fertilizer or Curbay the first season.

CAUTION — you who are trying rotary-tilling or direct-grind application of waste to soil (as advocated by some equipment people): This is good practice, but be sure to add a little limestone and some ActivO to the waste before digging in. Otherwise you may severely upset both pH (acidity-alkalinity) and bacterial balance of the soil — and also nitrogen values may drop. In some cases, unless properly handled, odors may result.

In event you cannot obtain finely ground limestone or rock phosphate locally, we can supply. Ask about special offers on these materials when purchased with ActivO. We can also supply Liquid Curbay if not available in your locality.

Those who desire more rapid decomposition of dry, non-nitrogenous materials such as leaves and sawdust may use a "starter" we have developed to team with ActivO. This embraces minerals and nutrients. Information on it will come to you if you mail the coupon.

Probably ready by the time you receive this is a new commercial compost energized with ActivO and made from manures, named "Grow Power." For those who cannot obtain wastes for composting, this is ideal — ready to use. It's priced quite reasonably — ask about it.

— Research Dept., Benson-Maclean.

Best News in Gardening!

TRY THIS ORGANIC DISCOVERY OF SCIENCE AND SEE IF YOU DON'T AGREE

Makes compost quicker, easier, cheaper and better out of difficult materials.

•

Use even sawdust and chaff. Compost garbage and sludge without odor! These make the richest humus known to man!

•

See the magical difference it will make in weak, sluggish soils—just a few handfuls mixed into soil. It conditions, activates—adds life, energy and vitality. Try it in *potted plant* soil by all means.

•

Use ActivO to reduce odors in outdoor toilets—while it converts the waste into an ash-like fertilizer-humus.

•

All organic—no chemicals! Nature, herself—*amplified*, and packed in a can! SEND NOW FOR *ALL* THE INTERESTING DETAILS.

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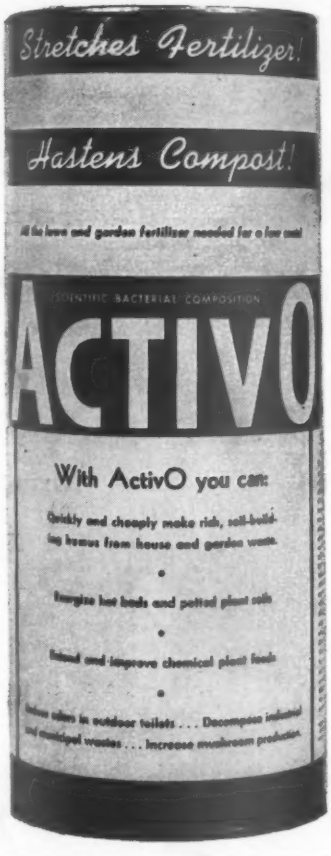
Please do not accept substitutes. **There's NOTHING like it; nothing "just as good."**


Stretches Fertilizer!
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All the lawn and garden fertilizer needed for a low cost
SCIENTIFIC BACTERIAL COMPOSITION
ACTIVO
With ActivO you can:
Quickly and cheaply make rich, soil-building humus from house and garden waste.
Energize hot beds and potted plant soils
Extend and improve chemical plant foods
Reduce odors in outdoor toilets ... Decompose industrial and municipal wastes ... Increase mushroom production.

Plant a little with each seed and see the difference in your plants—and the yield! Flowers, too, have better color.

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Use ActivO to make your own organic fertilizer and liquid manure — quickly (complete directions tell you how to do this and dozens of other unusual garden tricks.) Use it in hot beds, or to make hot beds without manure.

•

ActivO is a rich, black, velvety humus fortified with billions of Nature's own beneficial micro-organisms, hormones, vitamins, minerals and the mysterious biotics, Nature's balancers.

•

Its cost is amazingly little. (See below.) And it's *good for* your compost, *good for* your soil, *good for* EARTHWORMS.

•

At dealers in sizes at $1.00 and up. See your dealer TODAY — now. If your dealer doesn't have it use handy coupon below.

MAIL TO **BENSON-MACLEAN PLANT PRODUCTS, Bridgeton 34, Ind.**

Northeastern States: Address ActivO-Soilservice, P. O. Box 131, Townsend, Mass.
West Coast: Address ActivO West, P. O. Box 227, Rivera, Calif.

Inclosed is .....for $.....Send the following: (Add 10% West of Rockies)

- ☐ **No. 25 size for 3 tons compost, at $6.99, prepaid — with FREE plans for Composter Cabinet pictured below.**
- ☐ **No. 50 size, for 6½ tons, $11.95, freight collect with FREE plans for building Composter Cabinet pictured below.**
- ☐ **No. 100 size (12 tons), with free plans, $19.95, freight collect.**
  (Other sizes at dealers)
- ☐ **FREE literature — ActivO and composting.**

Prices do not include state sales taxes.

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And Address .....

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If different from P. O.

ActivO makes compost in sanitary CABINET — in basement, garage or tiny backyard. Free plans with No. 25, 50, and 100 sizes. Check above.

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